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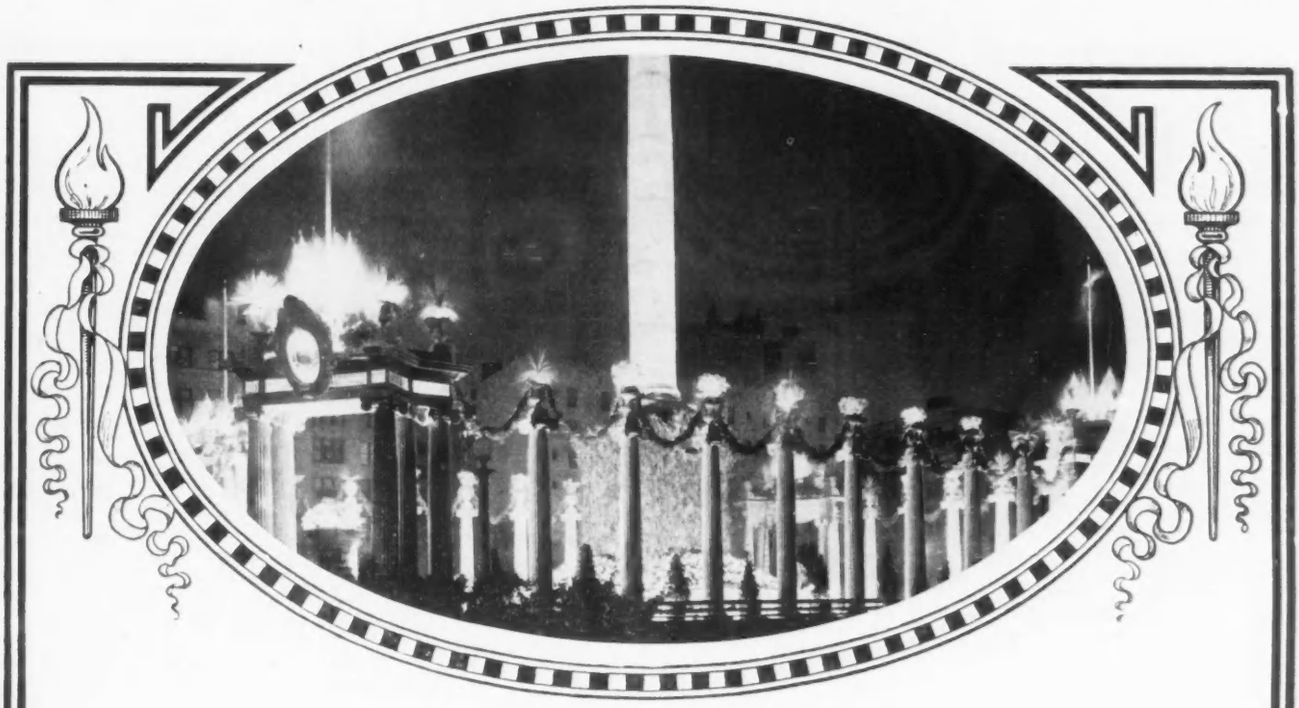

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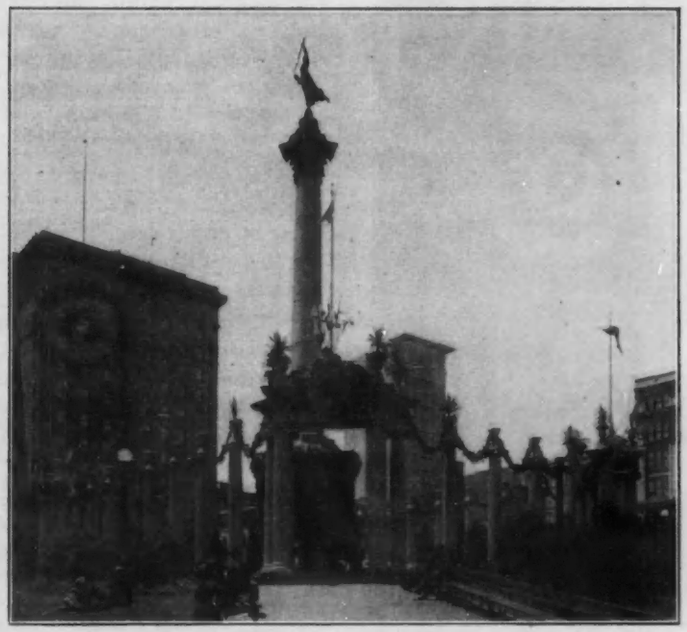
National Electric Light Association Convention

The thirty-eighth annual convention of the National Electric Light Association at San Francisco this week was the largest and most representative gathering of electrical men ever held in the West. Measured in terms of delegate miles it was also the largest in the history of the association, though the numerical registration was about one-half that of the usual Eastern convention.

The exercises opened with a brilliant reception to the president in the ballroom of the St. Francis Hotel on Monday evening. Following the reception dancing was enjoyed until a late hour.

Monday night also witnessed the first public illumination of the Temple of Light, a beautiful colonnade which had been erected in Union Square Park by the local members in honor of the visiting National Electric Light Association delegates.



N. E. L. A. Colonnade.

This temple consisted of a rectangular Italian colonnade of the Ionic order, held together by pavilions in the corners and set off by magnificent floral decorations, the foliage being studded with Novagem jewels, as used on the Tower of Jewels at the Exposition.

The color scheme consisted of buff, red, yellow and blue in soft tones. This was carried out in the painting, flags and transparencies, including the N. E. L. A. emblems.

The illumination consisted of concealed flood lighting with Mazda lamps in white and red. The flowers, flags and transparencies were featured, and strong illumination projected on the interior of the enclosure. The exterior of the pavilion was carried entirely by extraneous light. No special attempt was made to feature the monument which rises softly from the beautiful floral mass.

The flood lighting of the monument and central floral decorations was accomplished by a system of footlights concealed at the base of the colonnade in the following locations:

4750 watts at the southwest and southeast corners.

1500 watts at the center of the south side.

750 watts at the center of the east and west sides.

1800 watts at the center of the north side.

All these lamps were equipped with Holophane D'Olier reflectors. Two feeders were installed, and alternate lamps, carried in red, were controlled by one of these feeders.

Each of the small trees standing between the columns was lighted by two 60-watt red lamps concealed at its base. Three 40-watt lamps, one red, were used in each of the flower vases surmounting the columns. The four large corner vases each had three clear and one red 150-watt lamps. Two 150-watt lamps illuminated each flag. The red-orange glow from the glass panels of the corner entablatures was produced by four 100-watt lamps at each corner. Each of the glass centers of the four cartouches bearing the monogram of the N. E. L. A. was illuminated by two 100-watt lamps. The firefly effect in the shrubbery about the base of the monument was produced by hundreds of "Novagems" hung in the foliage.

The color decorative illumination was designed by W. D'A. Ryan, illuminating engineer for the Panama-Pacific International Exposition, the floral effects by

MacRorie-McLaren Co., and the entire colonnade was designed by Reid Bros. of San Francisco.

The real business of the convention began in Native Sons Hall on Tuesday morning with President H. H. Scott in the chair. The sessions were of five classes, —general, technical, commercial, accounting and hydroelectric, parallel meeting of all but the general session being held during the four days of the convention.

General Sessions.

The first general session was convened at 10 a. m. Tuesday with President H. H. Scott presiding. The delegates were given a hearty welcome to the city by Mayor James Rolph Jr., and John A. Britton extended cordial greetings on behalf of all the Pacific Coast.

President's Address.

President H. H. Scott, in his annual address, after commenting on the remarkable development of electricity in the West as one of the reasons for holding the convention in San Francisco, briefly reviewed the work and growth of the association and its committees during the past year.

Holton H. Scott.

Under the subject of new sections he announced that an accounting section would be created at this convention and also urged that a manufacturers' section be formed.

He spoke in detail of co-operative work with other technical and commercial organizations and stated that the executive committee had endorsed the plans of the Society for Electrical Development for an Electrical Prosperity Week, November 29 to December 4, 1915.

Particular attention was called to the fact that the association had been of great assistance to public service commissions. The association has fifty committees with a membership of 500 men actively contributing time and effort to carry on the work.

With regard to future constructive work of the association President Scott spoke as follows:

"I believe that no matter which city or town you may live in, and no matter how large your various business institutions are, the most important institutions, viewed from the public standpoint, are the public utilities companies, and of these companies, not the least important are the electric light and power companies. If this is true it should follow that the managers should be leaders in all matters that concern the welfare of their communities.

"In recent years it has been very noticeable that a considerable percentage have taken a much greater part in commercial clubs, civic federations and other bodies having an interest in municipal welfare.

"But are managers making the best of their enviable positions to make their consumers, and thereby the general public, understand the true nature and the real problems of our business? A representative of the central station industry comes into personal contact with every property owner, or renter of property, in practically all towns and cities, one or more times every month in the year.

"We sometimes boast that our industry has, upon the whole, attracted a very intelligent and industrious class of employees, but I wonder if the employees who are in contact with the consumers and the public could answer only a few of many questions that daily arise.

"Could he explain in a simple manner how and why corporations were created? Does he know what a mortgage or a bond is and could he explain the provisions of a mortgage if there is one on his particular property? Could he explain the difference between an ordinary mercantile business and the public utility business? Does he know that, when averaged over a period of time, it is necessary to provide $5 or more of capital for each $1 of increased gross business and could he explain how new capital is raised for public utility enterprises?

"These and many other questions that could be asked seem elementary to some of you, but I am very sure that many of us have assumed that our employees are better informed than is the case and that it might be well to investigate the matter. It only seems to me to prove another excellent reason for employees or company section meetings through which valuable information can be disseminated.

"One of the problems that confronts us all the time is that the public does not comprehend that we are selling a service, not a commodity, or kilowatt hours. Neither does it know that while everything else is going up in price and we are paying more for our raw materials and labor we are giving the public approximately six times as much light for $1 as we did

fifteen years ago. The lamp committee's report this year contains an interesting curve showing the average kilowatt hour rates and the receipts per candle power of a number of the largest central station companies for the past eighteen years and forcibly emphasizes the statement just made.

"The public is receiving all the benefits of the wonderful increased efficiencies of the incandescent lamps and at the same time is, in many localities, requesting a reduction in the rates charged per kilowatt hour for current. It brings home forcibly to us that selling current on a straight kilowatt hour rate is not equitable, but that in addition to a rate for current we should have a demand charge and a fixed charge per customer.

"I asked Mr. Thomas A. Edison, a short time ago, how he first determined how to charge for electric current and he wrote the answer in his own hand as follows:

"'I sold light, never current. All lamps were 16 candle-power and was called the equivalent of a gas burner supplied with five feet of gas.

"'Our charges were based on gas at $2 per thousand, which was then the prevailing price.

"'The reason I wanted to sell light instead of current was that the public didn't understand anything about electric terms or electricity and had no confidence they ever could learn; but they did understand light and it was light they paid for and we could make explanations which they could comprehend.

"'Another reason why I did not want to sell current was that from my experiments I knew that the incandescent lamp was only the beginning, and that there were great possibilities of enormously increasing its economy, and I thought that the pioneers should reap some reward for these improvements. It was my idea that all the benefits which impovements in the lamps should attain, one-half should be given the public and one-half given the company. But for some reason after a few years the selling of current was introduced, thus destroying all chance of the companies gaining any benefits from improvements, in fact such improvements were a disadvantage, which to my mind is a poor business policy for the company and the public.'

"Mr. Edison is right when he says the companies should receive at least one-half the benefits arising from improvements made in appliances.

"It is true that the central station business, upon the whole, has continued to show gross increases during the period of the introduction of the high efficiency lamps also during the trying times we are passing through because other lighting business and additional power and industrial load has more than offset the losses due to the changes. But the tendency of the times is making it hard for public utilities companies to raise capital and if this continues it will retard the wonderful possibilities in the growth of the electrical business and the public will suffer.

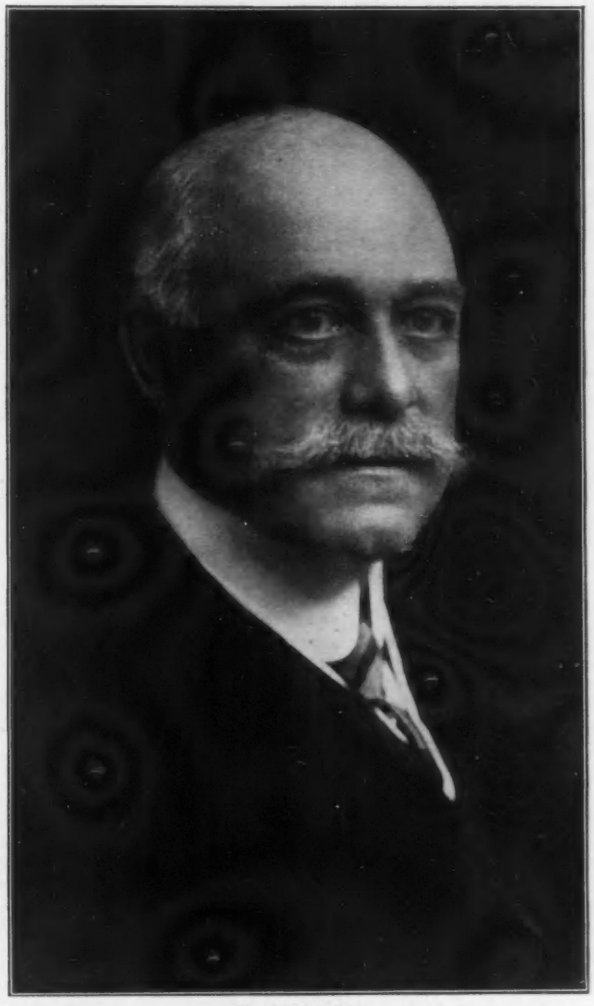
"For instance, if our regulating bodies will not allow a return sufficient to attract capital, fewer extensions to residential customers will be made and the extensions to the rural districts will be postponed. It is a fact that the public is more interested in the ability of public utility companies to keep pace with the growth of the communities and to render good service than in the rate for the service.

"In conclusion I wish to say I am not a pessimist, for we know the men in our industry have solved many big problems in times past and they are capable of ultimately convincing the public that capital and brains engaged in the central station industry should be entitled to the average reward."

Geo. Williams read the report of the committee on organization of the industry, showing that the association now has 13,450 members.

Secretary's Report.

The report of Secretary T. C. Martin summarized the extensive work of his office during the past year, particularly as regards the monthly bulletins and the maintenance of friendly interchange.



T. C. Martin.

Committee on Progress.

Secretary T. C. Martin's report on progress, as usual, presented a masterly summation of the present standing of the electrical industry. Particular attention was called to its remarkable recuperation from the conditions resulting in the fall of 1914 from the great European war. Attention was also directed to some of the conditions abroad in the central station field, with special notice of the differences in American and European wiring conditions. The section of the report devoted to municipal ownership, showed that, in spite of considerable agitation, private ownership in the central station field has relatively gained enormously during the last five years.

Detailed information was given regarding central station engineering work as well as lamps and lighting, miscellaneous motor work, electricity in rural districts, the electric vehicle, electric heating and cooking, interior wiring, and miscellaneous points in connection with central station management, employes and office buildings.

Question Box.

S. A. Sewall, assistant secretary of the association, presented an analysis of the Question Box, and a statement of the advantages it offers the members. A. J. Campbell also presented some good suggestions for Question Box revision.

Report of Insurance Expert.

In his report as insurance expert, W. H. Blood Jr., of Boston, stated that he had given special attention during the past few years to suits brought against member companies at the instigation of fire insurance companies. The insurance interests have specialized in these suits, while the attorneys of the electric lighting companies are at a disadvantage because they are unfamiliar with precedents and not ordinarily well posted on electrical matters. He has found it wise to give the local lighting companies' attorneys suggestions as to the kind of evidence necessary. As a result of this procedure new precedents have recently been established as the report details in several instances.

The National Electrical Code was revised this year, full details of which have previously been published. Attention was called to the general tendency to grounding of distributing circuits and to running the ground line as a solid wire. Renewable fuses again received consideration by the Electrical Committee of the National Fire Protection Association, but were not endorsed. It is considered to be an open question as to whether the cheapness of renewals outweighs the hazards involved in the use of device of this kind.

Revivals.

Paul Lupke, in a characteristically epigrammatic paper, pointed out the desirability of periodical revivals to keep matters from running in a rut. He showed that a revival is necessary to freshen the public corporation ideals, and layed stress upon the necessity of active assistance from every one connected with the industry to remove prejudice against utility corporations.

Technical Sessions.

Technical Sessions were held on Tuesday afternoon, Wednesday morning and afternoon, and Thursday morning. The Wednesday sessions were held in conjunction with the Hydroelectric Section.

Meters.

The report of the committee on meters, C. G. Durfee chairman, told of the revision of the Electrical Metermen's Handbook, a revised edition of which was distributed. The bulk of the report was devoted to methods of testing instrument transformers, shunt standardization data and notes on ampere meter tests, meter jewels and public utility regulations. A section was devoted to new demand instruments; and the recent developments in meters, instruments and auxiliary devices were briefly described.

Electrical Apparatus.

The report of the Committee on Electrical Apparatus, L. I. Elden, chairman, reviewed the prevailing conditions in the development and application of electrical apparatus in the supply of service for commercial purposes. Examples were cited of recent construction worthy of note for size and capacity In this manner reference was made to developments in generators, transformers, rectifiers and high voltage railway equipment, as well as portable and automatic substations.

Special attention was given to the phase advancer as an economical method for power factor regulation. Electrolytic arresters and suitable grounding were recommended in the operation of rotary converters. Methods were detailed for handling and repairing automatic oil-type circuit breakers. Description and results were given regarding the high frequency oscillation method of testing porcelain insulators. The alternating current network protector and the feeder regulator. Member companies were advised to adhere to the A. I. E. E. Standardization Rules in purchasing apparatus. Standardization of the requirement as to the connection of motors to company lines was also urged.

Grounding Secondaries.

The report of Committee on Grounding Secondaries, Paul Spencer, Philadelphia, chairman, called attention to the fact that the necessity of grounding secondaries is no longer a debatable question. All electrical engineers recommend it, and the National Electrical Code requires it. A summary was given of the regulations of all of the Public Service Commissions which have taken definite action on the question of grounding, and attention was called to the recommendations of the U. S. Bureau of Standards in this matter, as covered by Bulletin 54, issued by the Bureau.

Diversity Factor.

In a paper on Application of the Diversity Factor, H. B. Gear, Chicago, reviewed previous discussion of analysis of diversity factors and made a re-statement of the facts which give rise to diversity of demand. Attention was called to serious errors made by certain utility commission engineers and others in the application of diversity factor to determination of cost of service. Discussed present definitions of diversity and proposed definitions of group diversity factor and individual diversity factor. Relation of diversity factor to load factor analyzed and clearly defined. The paper was concluded with a statement of the relation to investment and numerical examples of the application of the diversity factor to specific cases.

P. P. I. E. Lighting Features.

W. D'A. Ryan, illuminating engineer for the General Electric Company, and chief of the Bureau of Illumination of the Panama-Pacific International Exposition gave an interesting address regarding the lighting features of the exposition.

Hydroelectric Section.

In his address as Chairman of the Hydroelectric Committee, M. R. Bump, New York, stated that the control of the attitude and actions of the association in respect to water power legislation is wisely placed in the hands of the Public Policy Committee. On account of the unsettled conditions surrounding the water power industry, it was felt unwise to attempt a compilation of existing state and federal laws, and it is to be regretted that the present year has not resulted in any definite settlement of the water power question. Special committees were appointed to consider overhead transmission problems, the care and operation of high tension apparatus, and the electrification of steam railroads. The committee earnestly recommended that the further prosecution of these subjects be carried out, and that in addition, other committees, such as a special committee on off-peak load and a committee on receiving apparatus, be appointed at an early date.

Hydroelectric and Transmission Progress.

As Part II of the General Report on Progress, Mr. T. C. Martin dealt with the proposed national legislation and summarized a great deal of valuable evidence with regard to the injurious effect of various proposed limitations and restrictions, from which the public suffers more than those who would otherwise devote their energies and capital to the utilization of our water power resources. In the technical part of the report considerable space was devoted to the rules of the California Railroad Commission in regard to circuits affecting or affected by inductive interference. Note was also made of a few power transmission plants, and more particularly of auxiliary steam substations intended to maintain continuity of service even through the utmost conditions of minimum water flow. Various features of transmission work were also brought to notice in regard to hydroelectric development and utilization in various parts of the country. A final section was devoted to a few foreign plants and foreign conditions.

Prime Movers.

In his report as chairman of the committee on prime movers I. E. Moulthrop of Boston briefly summarized recent improvements in the design and construction of apparatus.

In the steam power section particular attention was paid to a condenser design, underfeed stokers and turbines. Warning was given as to the danger to boilers in using carbonate of soda as a boiler compound. Brief mention was also made of Economizers, Coal Dust Burning, Fusibility of Ash, Air Leakage in Boiler and Economizer Settings, Instruments for Checking Boiler Performance, Improvements in Older Types of Condensers, New Method of Determining Condenser Leakage and Air Cleaning for Turbo Generators.

In the water power section reference was made to three recent notable water power developments typical of high, intermediate and low head practice, respectively. The following subjects were also taken up: Recent progress in water wheel design; governors—open vs. closed type oil pressure systems; governor effort analysis; practice in high head hydraulic plants; methods of water measurement.

In the gas power section a complete statement was given of the fuel oil production and probable supply in the United States and Mexico, which indicates that there are vast quantities of this valuable fuel available The progress of the development in this country of the Diesel engine was outlined and a brief paragraph covered the progress of the American Humphrey pump.

Several written discussions on the Report on Prime Movers were received, after which Philip Torchio of New York briefly reviewed recent European development in steam utilization, including the use of economizers and the use of motor-driven auxiliaries.

J. A. Lighthipe of Los Angeles showed that the practice of the Southern California Edison Company at Long Beach, Cal., was even in advance of the European methods. In addition to economizers and motor driven auxiliaries a full set of testing equipment, steam flow meters, CO_2 recording apparatus, etc., was regularly employed, so that under favorable load conditions it was frequently possible to generate 300 kw. per bbl. of oil. Fuel oil was of great aid in economical operation because of minimum storage, handling and ashes. Natural gas is also becoming an important factor in steam generation in California.

F. H. Varney of San Francisco corroborated the recommendation in the report regarding care in the use of soda ash and stated that pitting had been practically obviated in the boilers of th Pacific Gas & Electric Company by removing all air from the feed water. This is accomplished by pre-heating in an open type of heater using either exhaust or live steam.

W. D. Peaslee, Corvallis, Ore., in discussing the chemical method (salt solution) of measuring the flow of water suggested a remarkable simplification for determining the amount of salt in solution by measuring the conductivity of the sample. As shown

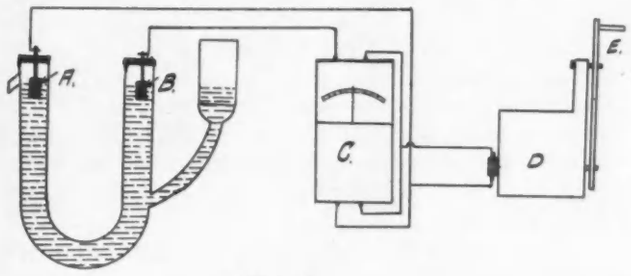


FIG. 1.

herewith, this is done by filling a V-tube with the sample, this tube having platinum electrodes A and B, C is a direct reading conductivity meter and D a continuous current hand-driven dynamo. When properly calibrated the meter deflection indicates the conductivity of the sample under test, from which it is possible to determine the amount of salt per liter by means of Kohlrausch's curve. An accuracy of 0.5 per cent has been obtained repeatedly.

O. B. Coldwell, Portland, told of preliminary experiments for determining the flow of water in a 9 ft. penstock by a direct reading of its conductivity as flowing past a "screen" suspended in the pipe and connected to an indicating instrument.

Limited time prevented any open discussion on the gas power section of the report.

High Head Hydraulic Plants.

In his paper on Practice in High Head Hydraulic Plants, J. P. Jollyman dealt with the features of high head plants which pertain to the control and utilization of water under high pressure. The design and operation of pipe lines, also the types of water wheels and their limizations were considered. The general arrangement of high head plants was discussed. Data pertaining to several high head installations of Francis turbines and of impulse wheels were also given.

Governor Effort.

In a paper on Analysis of Governor Effort, E. D. Searing, Portland, Ore., summarized experiments in analyzing a governor problem of the Portland, Railway, Light & Power Company. In analyzing the governor effort three existing methods were tried and discarded. Steam engine indicators were then connected to each end of the governor cylinder of the water wheel unit to be investigated, and continuous records of the varying pressure from each side of the governor piston throughout one cycle of operation were obtained. An analysis of effort, separating friction and unbalance, was made; the rise of pressure in wheel casings, high pressures in governor cylinders, over-speed devices and the wicket gates themselves were thoroughly studied. Some formulas and many illustrations are given.

Oil Burning.

C. H. Delaney of San Francisco discussed the operation of steam plants used as stand-by in connection with hydroelectric systems and the features wherein an oil burning stand-by plant differs from a coal burning plant. An oil burning furnace was described in some detail and its advantages and disadvantages stated. The paper closed with a discussion of the turbine and its auxiliaries—the largest expense in the operation of these plants. It becomes evident under the analyses given that if it were not necessary to keep the turbine in operation the cost of operating the plant could be greatly reduced. Assuming, however, that the turbines must be kept operating at speed certain economies can be effected by installing apparatus suitable for this type of service.

Pacific Coast Water Power.

P. M. Downing, San Francisco, read the paper on Western Hydroelectric Transmission Developments, as printed in the Journal, June 5th.

Overhead Line Construction.

The report of Committee on Overhead Line Construction as presented by Thomas Sproule, Philadelphia consisted of a review of the many activities tending to regulate the construction and operating of overhead lines, particularly drawing attention to the necessity of co-operation with various other engineering and semi-engineering societies issuing such reports, and making recommendations.

Electric Line Distribution.

In a paper on Electric Line Distribution in the Pacific Northwestern States J. C. Martin, Portland, compared the conditions peculiar to the West with those found in the East as justification for high voltage distribution in this territory. As the N. E. L. A. specifications are largely based upon Eastern practice their enforcement by regulatory bodies has frequently worked a hardship on Western companies, particularly as regards the 5000 volt limit for "crossing" specifications. Relief was asked from these requirements.

As the specifications for overhead line construction had previously met with much criticism from Western members this report likewise stimulated considerable discussion. Mr. Sproule stated that there had been no compromises on the joint committee and he promised full support to the West.

J. E. Kearns, Schenectady, suggested that lightning arresters should be placed on the same poles as transformers, tests having shown that better protection is thus afforded.

Chas. O. Poole, Riverside, called attention to the need for the standardization of crossings. Under the present rules the same crossing is required over a road used by a team once a month as over a city street.

High Tension Transmission.

In the report of Hydroelectric Sub-Committee on High Tension Transmission and Construction, as prepared by R. J. McClelland, New York, emphasis was laid upon the importance of two questions of public policy involved in public regulation and standardization. The first is the difference in physical and economic conditions and in requirements as to service and hazard between densely populated, highly developed regions and sparsely settled regions in an active stage of development, particularly in the West or South. It appears inevitable that broader consideration than in the

past must now be given to the significance of these differences and to the corresponding need of a difference in economic and engineering practice, in the interest not merely of the electrical power industries, but of the districts served by the industries.

The second question is that of inductive interference between power lines and telephone or other communication lines. There are many technical and scientific problems involved, but of more immediate importance and more general interest is that of a line of public policy according to which the interference between the two utilities may be adjusted. The California Railroad Commission has recently adopted an elaborate set of rulings covering the question of inductive interference, and these rulings, owing to their importance as precedents and to the startling character of certain of their provisions, have been regarded with grave concern by the power companies in other parts of the country. Both of these questions are likely, in the very near future, to be of direct personal interest to most of the companies operating overhead electric lines, and it is important that their significance and the full effect of the various proposed standards be appreciated.

A. J. Bowie Jr. stated that the inductive interference order of the California Railroad Commission placed the burden on the power company and permitted the committee to be a dictator of terms. The order discriminates against the use of air-break switches as well as outdoor substations. The report of the committee was defended by J. E. Woodbridge and A. H. Babcock of San Francisco. Philip Torchio, Philadelphia, defended the oil switch. Harold Goodwin of Philadelphia stated that the telephone company should be required to show the need for any change and define its nature. J. A. Vahey, Boston, stated that the problem belongs to the telephone company. L. L. Klauber, San Diego, stated that series arc lamps on their system seemed to cause much trouble on account of inductive interference.

A telegraph message was received from E. B. Rosa, chief of the U. S. Bureau of Standards, stating that the date for the discussion on the new safety rules had been postponed from July 1 to October 27, 1915.

High Tension Apparatus.

As chairman of the hydroelectric sub-committee on high tension apparatus, W. N. Ryerson, Duluth, Minn, suggested the preparation of a manual covering installation and operation of high tension apparatus, this work to cover everything from low tension oil switches of transformers to low tension switches in substations. A list of the important points to be covered by future committees in carrying on this work made clear the great diversity of subjects to be taken into consideration and the need of a systematic and uniform system of compiling the data.

Terminology.

The report of Committee on Terminology, A. S. McAllister, New York, consisted of definitions and terms used to designate various operating factors, circuits, instruments, machines, wires and cables, and lamps and lighting. They represent a careful editing and arrangement of standards adopted by other organizations.

Street Lighting.

The Report of Committee on Street Lighting, J. W. Lieb, New York, digested information regarding street illumination in New York. A statement was made of the illuminating efficiencies of street illuminants as made available through the courtesy of the Lamp Committee of the Association of Edison Illuminating Companies. In addition there was made a report from the committee to the member companies on the manufacturers' development policies in the field of the incandescent and the arc lamp.

Underground Construction.

The report of the committee on Underground Construction, P. Torchio, New York, was divided into three sections, treating of manhole and conduit construction, cable data and protection, and equipment, devices, etc. Cost, design, fire and accident protection were the main standpoints of treatment. A typical specification and contract for subway construction was also given.

Accident Prevention.

The report of Committee on Accident Prevention, M. J. Insull, Chicago, traced the growth of the safety movement and the results obtained. First aid; safety devices and appliances; analyses of accident reports; safety rules; future cooperation with the Bureau of Standards in the preparation of an electrical code, were the principal subjects considered.

C. B. Scott of Chicago also presented a paper regarding Opportunities of Public Service Companies in General Accident Prevention, special emphasis being laid upon welfare work and education of the public.

Diversity Factor.

H. B. Gear presented a paper on The Application of the Diversity Factor, showing how it reduces the amount of capital required to carry on a business and makes possible a greater income per dollar invested. The wrong use of diversity factor and load factor were also illustrated, the paper closing with an example of the principles applied to investment.

The Electric Vehicle.

A. J. Marshall, secretary of the Electric Vehicle Association of America, read the paper on The Electric Vehicle and the Central Station. The aid of the central station was requested in furthering the use of electric vehicles, many styles of which were illustrated and described, together with data on cost of operation. The value of vehicle charging as load is fully detailed, with suggestions as to methods of obtaining this class of business.

Commercial Sessions.

The several sessions of the Commercial Section were largely attended and great interest shown in the reports and papers presented. Chairman Douglas Burnett briefly reviewed the work done during the past year and showed that the Section is more than self-supporting, due to the large increase in membership and to profits from the sale of publications.

The report of the finance committee, as read by E. A. Edkins, showed that the section was in a most healthy condition. The report of the membership committee showed that about 23 per cent of the association were members of the commercial section. The report of the publications committee called particular attention to the literature on exhibit regarding a residence campaign.

Considerable discussion was held regarding methods for conducting residence campaigns. J. G. Learned sells housewiring as a merchandising proposition, using booklets and supplementary aids. L. D. Gibbs told of a novel store service campaign. L. C. Osborne, Spokane, told how 2000 kw. had been added to their lines by personal solicitation.

N. H. Boynton, Cleveland, advised that it is more effective to adapt stock advertising literature to special requirements, rather than trying to originate new publications.

Douglas Burnett, Baltimore, mentioned a plan of attaching tags to the fixtures of a house to be rented, so that the consumer could advise central station of his occupancy and desire for service.

Education of Salesmen.

In the report of Committee on Education of Salesmen, F. R. Jenkins, Chicago, the committee recommended to the Association an educational course to be conducted by correspondence. This course has been compiled by men directly allied with, or engaged in the central station business, and principally by men connected with the commercial departments. The course is intended to assist the student in keeping pace with the rapid development and the uses of electricity, thereby enabling him to prepare himself for advancement.

The recommendations of the report on education of salesmen were heartily endorsed by all speakers, including F. R. Jenkins, R. S. Orr, R. E. Young, H.

P. Pitts, S. M. Kennedy and F. A. Leach. Particular attention was called to the necessity of having class leaders.

Sales Development in the West.

Typical current consuming installations in the West were illustrated and described in a report presented by J. M. McDougal of San Francisco. These included gold dredging, mining and milling, copper mining and smelting, together with giant powder and rubber manufacturing, sugar refining and wireless telegraphy.

The report on power sales called forth a number of questions which were answered by the author. A sugar refinery plant has a load factor of 60 per cent for 10 months, being closed during December and January. Steam is used for heaters at a pressure ot 110 lb. The introduction of electricity for sugar refining was facilitated by the superior grade of sugar manufactured with live steam.

A wound rotor motor is used for dredge work, the regulation of the load depending upon the number of dredges.

A. E. Wishon of Fresno, Cal., stated that oil pumping gives an 80 per cent load factor.

Merchandizing.

The report of the Committee on Merchandizing and Recent Development of Electric Appliances as presented by R. R. Young, Newark, N. J., covered four different phases of merchandizing, presenting a study of the subject under the headings, "Analyzing the Market," "Factors in Creating a Demand," "Managerial Point of View," "Detailed Handling of Retail Sales," "Campaigns" and "Buying." It also touched on advertising, showing the need of co-operative work between the manufacturers and central station managers, comparative mehods of advertising, value of card file and mailing lists, and the cumulative value of advertising. The theory and practical handling of merchandise displays both in show windows and in interiors was given in careful detail.

A list of some successfull installations of standard appliances was given together with a digest of recent development in electrical appliances. The report included also a list of available electrical apparatus for various industries, a directory of electric appliance manufacturers, various forms and outlines, and a bibliography of sources of information on all subjects of the report. It also included a list of books which should be helpful to the progressive new business man in studying the merchandising subject.

C. N. Stannard of Denver opened the discussion by expressing his belief in the use of a card system of residence prospects. He advocated morning meetings for salesmen and suggested that commissions might be paid in proportion to the increase in gross revenue.

W. W. Briggs of San Francisco stated that central stations should maintain prices for lamps and appliances.

Report of Lamp Committee.

As prepared by F. W. Smith, New York, the report showed that lamp sales fell off during 1913, owing to disturbed conditions, whereas the increase over 1912 was 11 per cent. The Mazda lamp now totals over 70 per cent of the domestic lamp sales, or 2 1-3 times the sales of all other lamps combined. Under "Development" the committee treated rather fully the important steps and progress made by the manufacturers throughout the year, including description and illustration of new shapes for bulbs, ventilation, efficiency, mounting of tungsten filament in vacuum lamps and other details. New types of lamps standardized since May 1, 1914, were listed in full. Lamp prices were shown to have been reduced from time to time.

Municipal street lighting with the Mazda C lamp was treated at some length, the report showing a considerable increase by central station companies in this class of business with the new illuminants. An interesting device for calculating life under this heading was illustrated and described, as was a number of commercial applications of the Mazda C lamp.

The question of fixtures now available for the higher efficiency lamps was treated at length.

The committee treated the subject of standard voltage and the matter of company lamp policy, advising that companies continue a supervision over the lamp situation and the protection of their consumers.

Wiring Existing Buildings.

R. S. Hale, as chairman of the committee, presented a report divided into six parts. Part 1 dealt with the standardization of plugs and receptacles. Distinct progress has been made toward classification of plugs and receptacles. The committee is continuing work with the idea of reducing the number of types in this class, until finally receptacles and plugs for use on lighting circuits shall be as standard as the present lamp socket and base.

Part 2 referred to the question of wiring and reiterated the committee's recommendation in favor of unit prices so as to enable central station solicitors to close contracts and yet let wiring contractors do the work.

Part 3 dealt with the question of the wiring handbook.

Part 4 reported upon the standardization of screw threads for lamp bases, in regard to which the proposals of the committee of the American Society of Mechanical Engineers have been accepted.

Part 5 covered the work on the National Electrical Code. Some changes were suggested, through the Association Insurance expert, Mr. Blood.

Part 6 discussed the question of bare concentric wire. The Underwriters appeared to approve thoroughly of the system, but in order not to move too fast merely continued the committee for further investigation. Parts 5 and 6 also included a general discussion of this whole question of improvement in the Code. Heretofore the Code has checked to some extent the development of any system calling for thinner parts or less insulation, and the result has been a steady increase in the cost of wiring, which is a menace to our industry.

Rate Research.

The report of the Rate Research Committee, R. S. Hale, Boston, briefly reviewed the methods by which present rates for light and power were derived. Six general principles appear, consciously or unconsciously, to have been followed in obtaining these rates. Briefly stated these are to the effect that rates should in no case go below bare cost or increment cost, while on the other hand, if any section of the rates, is placed so high that it discourages business, the class that would otherwise be served pays nothing toward expenses, and, finally, between these limits the lower rates to all are obtained by considering "value-of-service" while taking care that the total rates shall not give more than cost plus a fair profit on the whole investment. The possibility that the rapid increase in efficiency of lamps may make a change in rates necessary was discussed. Attention was called to the various detail questions that are coming up from time to time before courts and commissions, and to the general soundness of the decisions of commissions on these various points.

J. E. Kearns, Schenectady, suggested that the basis of charge be changed from the kilowatt-hour to some more familiar term. B. E. Hannon, Sacramento, reported that flat rates were being discontinued as rapidly as possible. H. W. Peck, Schenectady, stated that there were fewer complaints about rates where a large number of appliances are used.

S. M. Kennedy, Los Angeles, brought up the question as to whether a company is justified in selling power to high load factor business at less than average cost of production. C. P. Osborne, Spokane, W. W. Freeman, Cincinnati, and T. I. Jones, Chicago, agreed that it is justified because it is the means of reducing the average cost. Arthur Williams, New York, stated that it is not the average cost which should be considered in this case, but the increment. The report was accepted and "Rate Research" will be continued.

Power Sales.

The report of the Power Sales Bureau of the Commercial Section, C. J. Russell, Philadelphia, gave details as to the work of standardizing the collection of statistics and data and the establishment of a clearing house at headquarters for handling this work. Recommendations were made for extending the usefulness of the Power Sales Bureau and for co-operation between the Bureau and the Committee on Electrical Salesman's Handbook.

After reading the report the sub-committee presented a blank form to be used for recording power data. A size was decided upon to fit the handbook.

Electric Furnaces.

C. W. Bartlett, Schenectady, presented a paper on The Commercial Application of Electric Resistance Furnace, giving descriptions, illustrations and design of furnaces for four classes of work; (a) temperature 100 to 250 degrees C, (b) 250 to 450 degrees C, (c) 450 to 1000 degrees C, (d) 1000 to 1400 degrees C.

W. M. McKnight, Redondo Beach, Los Angeles, described the Stassano arc furnace installation at Redondo as used for making steel castings from scrap steel, showing its desirability as a current consuming device.

F. T. Snyder, Chicago, discussed Electric Furnace Power Loads as regards present and future applications, with particular advocacy of single-phase furnaces.

Power Sale Methods.

C. H. Stevens, Brooklyn, presented a paper analyzing one complete power sale. The first part of the paper outlined a typical organization to handle the work and its general equipment, and then showed the course pursued when the lead is first received, and how the salesman, after some difficulty with the architects and owners, obtains permission to test their present plant and to submit a proposition for operating an central station service. The result of the test made was shown and a typical proposition presented. Then followed the adverse report made by the consulting engineer on the proposition, and finally the arguments which the salesman presents to refute these criticisms, and to convince the owners that central station service will prove more economical than a private plant.

Accounting Sessions.

The 38th convention is noteworthy as marking the establishment of an accounting section, rather than a committee as has heretofore been the custom, proper by-laws being adopted. H. M. Edwards of the New York Edison Company was honored as the first chairman. In his annual report Mr. Edwards called particular attention to the improved status of the accountant, particularly because of the compulsory publicity of accounts now required by commissions. He submitted the proposed by-laws and stated that the accountant could greatly exalt his standing by his own efforts.

The report of the library committee showed that 7744 sets of forms had been collected and were at the service of members for inspection and use. As the report of the question box committee had not been received, its purpose was merely explained—that of interpreting rules of accounting.

Uniform System of Accounts.

The report of the committee on Uniform System of Accounts told of the results obtained from co-operation with similar committees from the American Gas Institute and the American Street Railway and Interurban Association. Considerable attention was given to the apportionment of charges for combined gas and electric utilities, the conclusion being reached that the method should be left to the judgment of each company.

Public Utility Accountants.

In his paper on Some Opportunities of Public Utility Accountants, L. R. Reynolds suggested that the association prepare an index of operating expenses as a preliminary step in defining accounts. Analysis was made of the N. E. L. A. classification with particular reference to depreciation and appreciation as well as differentiating between new construction and operating expenses and other charges to profit and loss. "The accountant is in the best position of any corporation to know its obligations, and it is his duty to see that reserves are provided for all contingencies."

Workmen's Compensation Insurance.

Walter G. Cowles, Hartford, Conn., presented a paper in favor of the stock insurance company system as compared to the mutual plan or company insurance.

Electric Vehicle Cost Accounting.

In his paper on Electric Vehicle Cost Accounting, W. P. Kennedy, New York, discussed the general subject of electric vehicle accounting and offers many definite statements concerning the practice of several companies doing a large business. Reference was made to the many reasons for uniformity in order that there may be a common basis for making comparisons. Two schedules, A and B, were presented which were analyzed and proved to be applicable to the affairs of either large or small companies. The idea was developed that in the interest of accuracy there should be as few as possible charges requiring daily records from garages.

Record of Property.

In a paper on Record of Property or Construction Expenditures, P. R. Ferguson, Riverside, Cal., urged the importance of records being made and maintained of all property acquired or constructed. A complete system for construction expenditures was outlined and many blank forms shown. A routine was outlined for requisitions, authorities, purchase, and work orders. Executive and construction departments should be able to get at the cost of the property not only as a whole, but by geographical areas.

Analytical Accounting.

In his paper on Analytical Accounting for Central Station Purposes, O. B. Coldwell, Portland, argued that classifications as made at the present time do not adequately provide the information needed for a complete analysis of the business of a utility. A study of the sequence of operations covering the five steps common to all central station business was made and examples given. Finally these classes of service appear under utilization where are added the expenses occasioned by the utility equipment, the commercial and the general expenses, all of which were suitably apportioned to these classes and to the direct users. A "post mortem" of the activities of a utility is interesting and of some value, but it is better to establish systems of analytical accounting that will enable us to determine costs as we go along. It is essential that the efforts of all public utility companies be concentrated on the subject in order that substantial progress may be made.

W. A. Hillebrand, San Francisco, stated that such a running account of operations offered many practical difficulties to accountants. Fluctuating seasonal demands, such as a pumping load, bring about fluctuating costs. Furthermore, it is difficult if not impossible to determine the cost of service, and most undesirable that the public get the idea that it can be determined. The chief value that the method offers is as a determinant of undue discrimination.

In answer to the statement that the adoption of these suggestions was a matter of policy which would have to be passed upon by the public policy committee, Mr. Coldwell stated that his purpose in presenting the paper was to emphasize the importance of an understanding of the inter-relation between cost accounting and bookkeeping.

Statistical Machines.

W. E. Freeman, New York, presented an illustrated paper describing various automatic, mechanical, punching, counting, sorting, tabulating and printing machines adaptable to various lines of accounting and statistical work essential for public service corporations, with particular reference to improvements in the art of mechanical accounting.

Meeting of Class D Members.

At a meeting of Class D members, J. F. Gilchrist, F. H. Gale and S. E. Doane were re-elected to succeed themselves. Election of a chairman will take place at a later meeting in New York. The committee comprises the following members: H. G. McConnaughy, secretary and treasurer; C. Blizard, S. E. Doane, F. H. Gale, J. F. Gilchrist, J. C. McQuiston, John Mustard, J. W. Perry, C. L. Pierce Jr., J. I. Ayer.

Public Policy Meeting.

The annual report of the public policy committee was read by Chairman W. W. Freeman. A brief review of the financial situation showed that securities of electric light and power companies have been less affected than those of almost any business enterprise. Member companies were advised "to broaden the market for their securities by keeping local investors informed as to the relative merits of electric lighting and other securities, and by a policy of frank publicity as to their earnings and financial condition."

With regard to regulation, a map was presented showing that 32 states have commissions regulating electric lighting utilities, 15 being without such regulation. Warning was given against the introduction of politics into commissions.

"The question of what is a reasonable rate of return has been passed upon in specific cases by the commissions of at least 15 states, and in cases of electric properties, 8 per cent is the figure which has generally been adopted; 7 per cent has been fixed in two cases and as high as 10 per cent in as many others."

Where companies undertake appraisals it is important that they "shall understand and be careful to include all of the elements of value, covering both physical and intangible property, which go to make up a proper and complete appraisal."

Attention was called to the franchise value case of the Public Service Company of New Jersey, whose final outcome is still in abeyance. The desirability of protection from competition was also urged.

"No electric rate case has yet been determined by any high court in any state; therefore, no final determinations of law have as yet been definitely established as surely governing the fixing of rates for electric service."

"Municipal ownership is probably neither more nor less an issue than it was a year ago. During the year, some additional municipalities have determined to follow this plan of handling their lighting utilities; others have, by vote of the people, refused to do so; and still others have abandoned municipal plants previously operated.

"Your committee continues to believe that municipal ownership and operation of lighting utilities is against the public interest excepting where, on account of local conditions, private capital is not readily available for such service. As an economic proposition, municipal ownership has not "made good." The apparent success, in the cases claimed, is due primarily to the fact that usually operating expenses only are charged against such plants, whereas interest and other fixed charges are provided through general taxation. This is indicated in almost every case where thorough examination has been made."

The application of the decision of the United States Supreme Court in the case of the Norfolk & Western Railway Company, decided March 8, 1915, "would seem, with combination companies at least, to entitle the company definitely to a reasonable return on its investment in each separate class of business."

The conclusion of the report follows:

Water Power Legislation.

Again Congress has failed to provide suitable legislation for the development of the country's water powers, although, during the last session of Congress, greater progress was made than formerly. Two bills were introduced covering respectively the construction of dams in navigable streams and the use of public lands. Both bills, after discussion and amendment, were passed by the House, and were reported out in the Senate, but failed of further action; therefore the work will have to be done over again in the next Congress. These bills, known as the "Shields-Adamson Bill" and the "Ferris Bill," represented a sincere effort to secure legislation which, while adequately protecting the public interest, would invite capital for the development of water powers. It is unfortunate that relief of conditions which have for years prevented any new water power developments should have been still further postponed. As remarked by Leader Underwood in his address in the House of Representatives on the subject: "For seven years Congress has continued its debate on this question, and while we talk about the conservation of our water power resources, other countries build dams and conserve their water powers, while ours go to waste." It is to be hoped that during the next session of Congress, definite legislation of a reasonable and satisfactory character can be agreed upon and enacted.

Co-Operation.

Your committee has endeavored, during the year, to keep in touch with public movements affecting the welfare of the industry and to co-operate with governmental authorities and other agencies interested in such movements. One of these agencies with which the committee is now in active co-operation is the Bureau of Standards at Washington, especially in connection with the proposed National Electric Safety Code.

Public Policy.

For years this committee has been preaching the gospel of first-class service, reasonable rates and liberal treatment of the public, as essential to the permanent prosperity of any utility company. Together with these cardinal principles, emphasis has been placed upon the education of employes for their own welfare as well as their companies', and definite plans have been advocated and quite generally adopted for bettering the conditions of employes and increasing their loyalty and efficiency to their companies in the service of the public. It seems impossible to your committee that any company which is familiar with the fundamental ethics of the industry can now ignore the principles and policies for which the Association has stood openly for years. It is doubtless true that there have been electric companies as well as others, which in times past have failed to recognize and meet fully their obligations to the public, although it is doubtful if the cases have been as numerous as indiscriminate criticism would imply.

Your committee, however, believes that the time has come to stop talking about the shortcomings of years long past as excusing a disinclination to give credit where credit is now due. The electric lighting companies of this country have reason to feel proud of their record of public service, which, in the main, has been honestly and efficiently performed. It can fairly be claimed that no single industry has contributed more to the comfort, convenience and welfare of the public in the past decade, and when it is realized that practically all of the gain in economies effected through the advance of the art, during such time, has been given with practical entirety to the public, the record of service is especially gratifying.

It may be well to ask whether the time has not arrived when it is fitting to say something about the obligations of the public to recognize and reward services faithfully and efficiently performed. Our companies are in a very real sense, public servants; their prime obligation is to serve the public, but their measure of reward ought to be reasonably proportionate to the value of the service rendered.

There is probably no other commodity generally used by the public today in which the seller has so little voice in determining the prices and profits received, as in the case of electric and similar utility service.

The capitalization employed, the character and quality of the service, the measuring devices used in determining the amount of service and the price charged are now in the last analysis fixed by the public.

There is danger that through too drastic restriction, the desirable incentive to unusual efficiency will be destroyed, and that the public will be the greatest sufferer thereby. There is real need today of an intelligent conception of the respective duties of public master to public servant as well as of public servant to public master. A servant who is

ill-fed and underpaid cannot render good service, whether such servant be an individual or a public service corporation. What is needed most is an appreciation of the actual facts, with a knowledge of which the public is inclined in to be fair.

It is difficult, to get the facts before the mass of people in any community, especially where they are being ignorantly or wilfully misrepresented by certain newspapers or other elements in the community whose interests seem to lie in constant agitation rather than in the adjustment of difficulties.

It is undeniable that a strong and efficient public utility in any community is a distinct asset to the entire community. It is invariably one of the largest taxpayers, and through its service promotes industrial development and general business activity.

In view of these facts, it is entitled to the good will of at least the intelligent members of the community, and the withholding of such good will is of direct disadvantage to all business interests. From selfish motives, if not otherwise, the business people in every community should exert every reasonable effort to promote a sympathetic understanding of the difficulties and problems confronting utility companies, in order to secure the measure of public cooperation to which they are entitled by reason of a service honestly and efficiently supplied, and in which the general public, whether they appreciate it or not, are essentially partners.

Your committee suggests to member companies that they should insist upon the recognition of their just claims for public support, believing that an aggressive policy with this object in view will attract attention and win respect.

While gathered at the "Golden Gate" and in at atmosphere of celebration of the newer developments and achievements of our beloved country, it is surely fitting to predict with confidence that honesty and efficiency in public service will not fail of ultimate recognition and adequate reward.

PUBLIC UTILITY REGULATION IN CALIFORNIA.

BY MAX THELEN.

I deem it particularly appropriate that this convention should be held in the state which has witnessed the greatest hydroelectric development of any of the states of this Union. Beginning with the construction of the first hydroelectric plant in California, near Pomona, in 1891, shortly followed by the Mill Creek plant, near Riverside, in 1893, and the first hydroelectric plant in northern California, at Folsom, in 1895, the development of hydroelectric energy in California has proceeded with marvelous rapidity. Today, twenty-five separate corporations are operating seventy-nine hydroelectric plants in this state. The energy thus generated is transmitted through more than 7500 miles of transmission lines and 18,000 miles of distribution lines. It is estimated that the hydroelectric plants now in operation in this state have a total capacity of 436,045 kilowatts and that over two billion kilowatt hours of energy were generated last year in the hydroelectric and steam plants in California.

Prior to the development of hydroelectric energy in this state, electricity was generated in steam plants usually serving only a single community and distributing electric energy almost exclusively for illuminating purposes, with some small power consumption. Today, with the development of hydroelectric energy has come an expansion in the use of electricity beyond the fondest expectations of a dreamer. Our hydroelectric plants now supply energy for illuminating purposes and for industrial uses; they operate our cement plants, our dredgers and our mines; they have made possible a system of electric interurban railroads, traversing the state in every direction; they have aided materially in the reclamation of our swamp and overflowed lands; and, most wonderful of all, they have made it possible by applying power in convenient form for the pumping of water, to develop thousands of acres of the fertile valleys of the state and to bring them to a high state of cultivation.

The development of hydroelectric energy in California has resulted in interesting and difficult problems which must be solved by the public authorities charged with the duty of supervising public utilities. The first of these problems is the regulation of rates. In the old days, when a steam plant served a single community and there were but few classes of service, it was a relatively simple matter to establish the rates. Today, with a single one of these hydroelectric utilities serving 175 cities and towns with many different classes of service, the problem of regulatiing the rates has become infinitely more complex.

In California the separation of control over public utilities between the railroad commission and the local authorities has made the problem more difficult. In the case of Town of Antioch vs. Pacific Gas & Electric Company, the commission regarded the company's production and transmission system as a unit and determined the average cost of electric energy delivered at the substation, irrespective of whether a particular substation is 10 miles distant or 100 miles distant from the source of power. By ascertaining the cost of distribution for the different classes of service in the town of Antioch and adding this cost to the production and transmission cost, the commission then established the rates to be charged in Antioch for the different classes of service.

The people of California have now adopted a constitutional amendment and the legislature has revised the Public Utilities Act, so that beginning in the first week of August, 1915, the California Railroad Commission will be charged with the responsibility of regulating rates throughout the entire state, in both incorporated and unincorporated territory. The commission will do doubt desire to give careful thought to the extent to which it will be possible to establish uniform rates for uniform classes of service performed by the same company in different portions of California. How far this uniformity can be established is a question on which I am not as yet ready to commit myself, but that the problem is an extremely interesting one will readily be admitted.

In this connection, you will be interested to know that the San Joaquin Light & Power Corporation, the Mt. Whitney Power & Electric Company and the Northern California Power Company, Consolidated, have already filed applications asking the Railroad Commission to establish all their rates to be charged for their various classes of service both in incorporated and unincorporated territory.

Another important problem in connection with the regulation of electric utilities is the construction of extensions. I will say frankly that the railroad commission is not satisfied with the attitude of certain of these utilities in northern and central California in the matter of the construction of extensions, particularly in cases in which the utility has a monopoly. The utilities cannot expect when they have a monopoly, to sit back in complaisant contentment and to take all the advantages accruing to them from the new policy of public regulation without being willing to make the necessary extensions to serve the territory which they claim as their own. The California commission will shortly give careful consideration to this problem.

Referring further to extensions, I am brought to a consideration of the effect of public regulation on the ability of utilities to secure the necessary funds for additions, betterments and extensions. In the eastern sections of the country, as is generally known, it is seriously urged by opponents of regulation that the effect of public supervision is to make it more difficult for utilities to secure the capital necessary for additions, betterments and extensions. The same suggestion is occasionally made here in California, although here it is generally done for political purposes.

The California Commission, from the very outset, has been mindful of this problem and has tried, while doing full justice to the public, to treat the utilities in accordance with a liberal and constructive policy so as to enable them readily to secure such funds as might be necessary for additional capital expenditures.

In the very nature of things, governmental supervision over public utilities should make their securities more salable. The investor is more inclined to invest his money in securities which have been vised by governmental authority than in those over which no supervision has been exercised. Furthermore, most public utility and railroad commissions in the United States, including the California Commission, have established the policy of protecting an existing utility from unnecessary competition, provided the existing utility is according rates as low as can reasonably be expected, is giving good service and is making the necessary extensions in the territory claimed by it. The California Commission has established certain qualifications to this general rule, to which it is unnecessary for me here to refer. As the result of governmental regulation over utilitly securities and of governmental protection to utilities which do their full duty to the public, governmental supervision ought, as I have said, to produce a more ready and stable market for the sale of public utility securities.

The conditions before and after public regulation of utilities have been strikingly illustrated in California. The Public Utilities Act, giving the Railroad Commission authority to supervise and regulate all the public utilities of the state, with the exception of certain powers temporarily reserved to the cities, became effective on March 23, 1912. Prior to that time, many of our corporations, including a considerable number of public utilities, were in the habit of issuing common stock to the incorporators for little or no consideration. These incorporators then understook to unload this valueless stock upon the public. Utility plants were almost entirely constructed from the sale of bonds sold at a discount, so that the utility started upon its career heavily overloaded by bonded debt. Promoters largely took the position that they would invest no money of their own, but would secure all the money from other people by the sale of bonds and the issue of notes. Many of the utilities had no constructive plan of finance, and went ahead blindly from day to day without reckoning tomorrow's need. Such financial methods inevitably bring about disaster. Some day the ship strikes the rocks, and then the unfortunate people who have invested their money in good faith in the securities of such corporations lose a large part of all of their investment. I have in mind a number of public utilities in this state, an electric lighting company, an interurban railway company and a water company, which were financed in the method which I have indicated and which are this very moment paying the inevitable penalty of such financing. In each of these cases the utility's condition is the result, not of regulation in the present but of the absence of regulation in the past, when they started on their career.

The unerring result of such financing, in the absence of regulation, is, of course, that ultimately people will lose confidence and will refuse to purchase any more securities of these corporations. The only alternatives remaining to such utilities are either to charge excessively high rates, so that investors may be induced to run the risk of further investment, or to sell the securities in some other part of the world, where the operations of the particular corporation are not so well understood. The first of these alternatives it is unnecessary to discuss. The people of the United States will no longer permit their public utilities to charge excessively high rates. The second alternative is founded on dishonesty and fraud. Whatever may have been done in the past the Railroad Commission of California proposes to see to it that when the investor living in other portions of the United States, the

peasant of France, the burgher of Holland or the merhant of England invest their money in securities issued by California public utilities, they may do so with reasonable assurance that the securities are honestly issued, that the proceeds will be honestly applied and that though the investor may live thousands of miles away, his interests will be reasonably protected by public authorities who insist on honesty and security in public utility investments in this state.

To say that utilities can secure money to better advantage without regulation than with regulation is to say that the investor consciously prefers a condition in which he is not protected to one in which he is protected—a conclusion too absurd for comment.

I have spoken of purchases of California public utility securities by investors living elsewhere. I desire now to go a step further and to express to you a hope which I have steadfastly maintained with reference to the sale of public utility securities, under regulation, by direct dealing between the utility and its customers, employes and the general public in the locality in which it does its business. It is well known that in England, gas and water utilities, under acts of Parliament, sell their shares by public auction or public tender to the people in the locality without the intervention of a middleman. It has been my hope that as the result of public regulation of utility securities, the small investor might ultimately regard them in somewhat of the same light as he now views federal, state and municipal securities, and that it might then be possible for the utility to sell a large portion of its securities at home, thus saving the large commissions heretofore paid to Wall Street. As showing that this hope is more than a mere dream, I desire to draw attention to an issue of first preferred stock by one of the large hydroelectric companies of the state, recently authorized by the railroad commission. This utility came to the commission and stated that it desired to try the experiment of selling first preferred stock directly to its stockholders, employes, consumers and the general public in California, thus saving the middleman's profit and materially strengthening the companys position. This plan was in line with the hopes which the California Commission has entertained for some time, and the commission readily and gladly authorized an issue of $12,500,000 of this preferred stock. It gives me great pleasure to be able to say that up to May 31, 1915, over ten million dollars of this stock had already been subscribed and that over seven million dollars of this amount has been subscribed in California. Of the amount subscribed here, some three million dollars has been subscribed by local stockholders of the company, over one-half million by employes and over three and one-half million by consumers and other members of the general public. Mr. A. F. Hockenbeamer, to whose genius and courage the success of this issue is largely due, tells me that up to date, the average cost of selling this stock has been about 85 cents per share. When contrasted with the sum of $5 for every $100, which California utilities have frequently been compelled to pay to the middleman for placing their securities out of the state, the immense advantage both to the utility and to the public of this method of selling securities is at once obvious. The point which I desire to make in connection with this matter is that without public supervision of utility securities, the necessary confidence to render successful this method of selling securities would generally be lacking.

I have spoken of what ought to be the effect, in the nature of things, of public supervision and regulation upon the sale of public utility securities. Here in California, however, it is not necessary to indulge in reasoning and analysis as to what ought to be the effect, for the reason that we have here a concrete and striking example of what actually has taken place under public utility supervision by the state. In the snow-topped Sierras, the Pacific Gas & Electric Company has recently completed its great Lake Spaulding project, and the Great Western Power Company has completed the construction of its Big Meadows Dam. The Southern Pacific Company is engaged in the completion of magnificent new depots in San Francisco and Los Angeles, and has submitted plans to the railroad commission for the construction of additional depots in Richmond, Modesto and Turlock. In San Diego, the Santa Fe has just completed a beautiful new depot, in the Mission style, a work of art in keeping with the history and environment of the beautiful southland. From one end of the state to the other, public utilities have added to their existing plants and have constructed new plants, to the great advantage of the state, during a period of supervision and regulation by the railroad commission. From March 23, 1912, to May 31, 1915, the railroad commission has authorized the issue of public utility securities in the amount of $426,983,979.83. Gas and electric utilities have been authorized to issue securities amounting to $131,609,175.89. A portion of the securities thus authorized were for refunding purposes, but the total of the securities authorized for the construction of additions and betterments has amounted in this period to the enormous sum of $239,790,155.01. The investment which has been made in California as the result of the issue of these securities is the greatest investment made by public utilities during any corresponding period in the history of this state. In these concrete facts and figures we find the most conclusive demonstration of the fallacy of the claim that under public supervision and regulation it is no longer possible for utilities to secure at reasonable rates the funds necessary for their continued development and expansion.

Whatever attacks may be made upon public utility regulation and supervision, the people of the United States will never turn back from the course upon which they have embarked. Mistakes may be made in the election of commissioners and the election of governors with power to appoint commissioners. Faithful and competent commissioners may fail to receive reappointment and entire commissions may have their efficiency weakened or destroyed. Other commissions will be ready to step into the breach and the great movement as a whole will go forward, step by step.

The question confronting our public utilities is no longer one of regulation or no regulation. The only alternative today and henceforth is regulation or public ownership. If any owner of a privately owned and operated utility believes that such ownership and operation is preferable to public ownership, an enlightened self-interest would obviously lead him to assist the commissioners instead of criticizing them and putting stumbling blocks in their way.

As far as the commissions are concerned, they will go ahead, fully conscious of the magnitude of their task, determined to do their work firmly but justly, exposing and punishing dishonesty where it is found, and seeking at all times to adopt and carry out sane, honest and constructive policies. And they will go on inspired by a realization of the fact that if their work is well done, it will not only operate to the undoubted advantage of the public utilities, but will also tend to bring greater happiness and prosperity to every man, woman and child in the state.

MUNICIPAL REGULATION OF PUBLIC UTILITIES.

BY JOHN H. ROEMER.

When the regulation of public utilities by municipal councils, generally called "home rule," is urged, its advocates do not seem to realize that state regulation is increasingly finding its justification, not in a political theory, but in the complexity of our civilization, and the growth of the public service industries to meet the needs of that civilization in the most economical way possible.

Through the advance of the sciences involved in those industries and through superior business organization, the interests of cities, towns, villages and countryside are to a greater extent common interests. Public utilities are forming a more and more important factor in the economic life of the people, wherever living.

Doubtless in the early days of the various public utility industries, they were largely local in character, confining their operations to the various municipalities in which they happened to be located. However, the operations of public utilities are becoming less and less merely co-extensive with the boundaries of any one municipality.

Thus, the city street railway system develops into the suburban and finally interurban. The long distance and rural telephone connections form a most valuable part of municipal telephone service. In the field of electric light and power, long distance transmission of current ignores absolutely municipal boundaries. Even with gas it sometimes happens that the gas is manufactured in one municipality and pumped to another, and where there is natural gas, almost invariably a number of municipalities are involved. Even water, when wells, lakes or rivers are not available, is frequently piped long distances, sometimes supplying several municipalities en route.

The growth of interurban mileage of both telephone companies and electric railways, the growth of the electric light and power industry, including development of water powers, and especially the marked tendency in the latter industry for the large central generating plant, with transmission lines, to displace the small independent plant—are all facts neither fully known nor appreciated by the public generally. This growth has been in the direction of fewer—at least of larger —systems; of consolidation and centralization, and away from the single municipality as a unit of service.

Statistics show that the telephone companies with an annual income of $5000 or more, have decreased in number 53.8 per cent in the last ten years, but the number of telephones has increased 216.4 per cent and the number per 1000 of population from 30 to 90. At the same time the estimated number of messages or talks classified as local exchange, has increased 170.7 per cent and those classified as long distance or toll, 182.3 per cent. While the companies taken as a whole have shown such a marked decrease in number along with an extraordinary growth in equipment, number of patrons, etc., the smaller systems reporting an annual income of less than $5000, including farmer or rural lines, have also shown a substantial increase both as to number and equipment.

The economic development of the electric public service industry has been found to lie certainly in larger and larger units of production. Considering the enormous increase in power and capacity from 1907 to 1912, the assumption seems reasonable that the end of this tendency is assuredly not yet in sight. Thus, from 1907 to 1912, due to the development of the turbine, the total horsepower developed increased over ten times as fast as the increase in the number of primary power machines.

Great as has been the increase in the development of primary power machines, it is far greater in the case of dynamos. Here the most phenomenal increase occurred. An inspection of the percentages reveals the astounding, almost incredible, fact that the total capacity incurred an increase nearly 360 times greater than the number of machines. The increase was not so great from 1907 to 1912, but still over 25 times as great.

From the foregoing it follows, as a general thing, that economy in this industry lies in the large generating station, and in the ability to mass enormous production. The municipally owned stations with primary power machines and dynamos of much smaller average capacity than the commercial stations, produce and sell their energy at a much higher cost relatively. But the larger hydroelectric stations far surpass the general average of either or of both.

The larger hydroelectric class, while constituting only 4.3 per cent of all the stations, produces 50.8 per cent of the entire output at a unit cost of 47.3 per cent of the general average. Were these stations to be excluded in reaching the general average, and, strictly speaking they probably should be, the contract would doubtless be much greater.

The economy in favor of the large plants is even more marked in Wisconsin than in the United States at large. In Wisconsin the hydroelectric plants produce 48.1 per cent of the total output at a unit cost only 20 per cent that of the general average.

It is very evident that the small isolated plant supplying the town or village cannot compet e economically with the substation on the transmission line of the big generating plant. Not only is the present trend toward larger and larger generating plants, with networks of transmission lines spreading over the country, because of the economy of enormous production, but because of the fact that electrical energy cannot be stored. This means that the more evenly the energy generated can be distributed over the twnty-four hours and from day to day, the closer will be the relation between the total demand and the total capacity of the plant, resulting in a better balance between the necessary investment and the total business required to pay fixed charges on that investment.

This principle has been illustrated substantially as follows: If a given amount of electric power is consumed within one hour of the twenty-four, but none the remaining twenty-three hours, the plant must be twenty-four times as large as though the same consumption were distributed evenly over the twenty-four hours. In either case there is the same amount of business but it will be much more costly in the former case than in the latter as the investment must be far greater and interest charges proportionately heavier. The large system supplying an extensive territory with divergent needs has this advantage over the isolated plant of greater opportunity for more economic distribution, resulting in a better load factor.

Growth in the electrical public service business and its economic changes have been so recent that there has not been sufficient time for the business as a whole to adjust itself. However, the 1912 census report informs us that in 1912 the proportion of stations buying current for distribution was double that in 1907, and states that there has been an even more pronounced tendency towards centralization of ownership and operation in 1912 than in 1907, but unfortunately the report does not present the statistics gathered in such form as to clearly bring out this fact. The Electrical World, two years ago, conducted an investigation of the subject in cities having a population of 5000 or more. The results of this investigation are extremely interesting and are commented on in the issue of December 28, 1912.

The economic development and distribution of electric energy is most vividly shown by the operation of the holding companies and large operating companies. Perhaps as clear an illustration as may be found among the many that might be cited of the benefit resulting to the public from a consolidation or combination of small electric utilities is the case of the Central Illinois Utilities Company. This company is serving 23 or more communities in Illinois with current for light and power from a single station. Formerly these communities were served by nine small separate generating plants.

Another illustration is the Central Illinois Public Service Company which served over 100 communities. Before consolidation these communities were served by 54 separate generating plants. Most of these have been closed down and shortly all these communities will be served by eight large central stations.

Comparison of service and rates in the communities served by these companies with those formerly in effect should furnish an object lesson to those who advocate the purchase or construction of isolated plants by municipalities.

When one appreciates how increasingly inter-related and inter-dependent public service companies are becoming, both as to their physical operation and their corporate control and ownership, one can hardly help asking himself:

Would absolute home rule of all public service companies be successful and would municipal ownership promote the most economic development of public utilities?

Consideration of the great difficulties involved must inevitably lead one to the conclusion that the answer to the first question is emphatically "no" and consideration of the direction that the economic development of utilities has taken, must lead one to the conclusion that the answer to the second question is also "no." In fact it has been suggested that if there is to be public ownership at all, a state ownership rather than municipal might often be more in line with the present and promised development of the public service industries.

Turning again to the question of "home rule," we find that difficulties spring up on every side. Perhaps the first difficulty which suggests itself is that the municipality's powers in the absence of delegation of special power by the legislature, are only co-existent with its own boundaries.

Now, the utility is entitled to a fair return on the value of the property devoted to the service for which the rates are being made. Thus, if a given company is serving, let us say, cities A, B and C from B, as a distributing point, it is, of course, proper that its rates in A should be sufficient to give a fair return on the value of the investment made necessary to give A its service. The mere statement of this fact is sufficient to convince one that it is the only reasonable ground on which to proceed—a fact generally admitted and given the approval of the United States Supreme Court in the case of the San Diego Land Company vs. National City, (1898, 174 U. S. 739) in which the court says:

> "One of the points in dispute involves the question whether the losses to the appellant arising from the distribution of water to consumers outside of the city are to be considered in fixing the rates for consumers within the city. In our judgment the Circuit Court properly held that the defendant city was not required to adjust rates for water furnished to it and to its inhabitants so as to compensate the plaintiff for any such losses. This is so clear that we deem it unnecessary to do more than to cite the conclusion reached by us on this point. If the municipality need not consider the losses on outside business, in fixing its rates, it surely follows that it cannot consider the profits on such business and make correspondingly lower rates. This proposition, it would seem, should rest on the well established principle that the state cannot consider intrastate profits and business in fixing interstate rates."

The whole problem is one of apportionment and accounting and it is submitted that even if possibly in simple cases municipalities have grappled successfully with it, the problem as a general principle, is emphatically one for the state, and not the municipality, to cope with successfully.

Theoretically it might be possible for the municipality acting separately to achieve results. The practical difficulties in the attempt of separate municipal units, rather than one powerful central body to correctly ascertain the necessary accounting facts with regard to a larger corporation conducting its business over an extensive area and in many municipalities, would be insurmountable.

It is not necessary to go into detail as to these difficulties. By way of illustration merely, the valuation and proper apportionment of an extensive electric lighting plant doing both power and lighting business, but with its chief generating plant in some other municipality—possibly a very substantial distance away—is suggested. Or, take the case of a comparatively small town receiving urban and interurban service from the same electric railway, light, gas or water plant.

Leaving problems of the foregoing nature, we find ourselves at once confronted with probably even more serious ones if the municipalities are to deal separately with the continually increasing extra urban and interurban activities of public service companies. In the first place, in the absence of specially delegated power, the municipality, as already noted has no extra territorial power. There are apparently a few cases in which this power has been granted and used, but the wisdom of such a course seems extremely questionable. This question of extra territorial municipal power is perhaps as well discussed as anywhere in the California case, South Pasadena vs. Terminal Railway Co., (1895, 109 California, 315.)

The city of South Pasadena granted a franchise to the defendant railway company for the use of its streets upon the condition among others, that round-trip fares between certain stations named within the city limits and the business center of the city of Los Angeles shall never exceed 30 cents. The court said:

> "Here was a road lying partly within the confines of at least three municipalities, Los Angeles, South Pasadena and Pasadena; conceding the right of plaintiff to impose limitation on the charges to be made for passage between stations within its limits, and stations elsewhere, then the other cities named have or might have the same right; but suppose the city of Los Angeles, as a condition of the occupation of its streets by the railroad, had ordained that the round trip fare between stations within its limits and South Pasadena should be more or less than that fixed by the ordinance of the latter city, that is, that the fare to Pasadena, a place more remote than South Pasadena, should be less than that to the latter point as fixed by its own ordinance, is it not plain either that a conflict must arise and inevitable discrimination between the places ensue, expressly prohibited by the constitution, Article XII, Sec. 21, or that the railroad company must charge only the lowest of the rates thus fixed by jurisdiction of equal authority, and so the ordinance prescribing the lowest rate be made operative in and between both places? Similar illustrations of possible confusion might be multiplied indefinitely."

The principle laid down in that case applies to all interurban and suburban activities of public service companies whether steam railroads, electric interurbans and suburbans or the rural and long distance service of telephone companies. Taken from a slightly different standpoint, they also apply to some of the other public utilities.

The adjustment of the rights of various municipalities served by the same corporation and physical system most clearly require an impartial central agency which shall administer solely with an eye to the welfare of the whole territory involved and of the state itself. Such a policy is the only one which in the long run is really conducive to the common interests of all.

Another point which suggests itself is this: While, of course, every one will readily admit that there are many matters of a purely local nature over which the municipalities should have exclusive control, it is certainly highly undesirable that a municipality should have the power to block the most economic development of the various public service industries to the best advantage of the state as a whole. The state's interest in public service operations of that nature was pointed out in a comparatively recent Texas case, (City of Texarkana vs. Southwestern Telegraph & Telephone Co., 48 Texas Civil Appeals 16.)

The facts as reported are not entirely clear, but apparently the city had acted arbitrarily in ordering the defendant to remove its poles and wires from the streets—not to underground them, but to withdraw entirely except for the long distance lines. The defendant had been furnishing telephones for public use and had duly obtained a permit from the secretary of state. There appeared to be no evidence that it had acted unlawfully in any way. The court held the ordinance invalid. The following excerpt is taken from the opinion (page 22):

> "When we consider the nature of the business of telegraph and telephone lines in this busy commercial age, we have a most cogent reason for the legislature's declining to commit to the arbitrary control of the municipalities throughout the state the use by such companies of the public streets and alleys. These companies are not primarily of local concern, affecting only the inhabitants of the towns and cities through which they pass, but they essentially concern the public at large. * * * * * * In other words, the business is such a one as calls for the exercise of state regulation rather than the delegated power of municipal control."

It is to the interest of the state as a whole that there should not be over-development in one locality and under-development in another. Ordinarly it is more economical, where possible, that new territory should be served by extensions from an existing plant rather than by the erection of an entirely new plant. In the electrical field, attention has already been called to the economy of large scale production and to the fact that as a practical proposition from the industrial standpoint, electric energy cannot be stored—in other words, must be used as produced—so that perhaps it could be said that the larger the plant and the closer between the maximum capacity of the plant and the demand at any time, the greater the economy.

It is almost impossible to conceive how the separate municipal units with their widely varying needs and conditions could achieve that continuity of policy and breadth of view necessary to successfully cope with these problems.

If the untility is municipally owned and has the power to supply beyond the municipal boundaries, the duty of making extensions, however necessary, to meet the requirements of suburban and interurban population, will always be dependent upon the attitude of the citizens of the municipality owning the utility. Objection to taxation necessary to meet such requirements will often prove an obstacle to the natural development of the utility. The economic desirability in cases of this nature of extensions rather than the erection of new plants, has already been noted. As a practical proposition, in such cases the only opportunity for obtaining the service would lie in extensions.

To consider another aspect of the regulation of public service companies. Many seem to think that municipal ownership is an adequate substitute for regulation. This belief, while possibly natural for those who have never given the subject much study or consideration, is a great mistake.

No municipality has been able to manage any business enterprise as successfully and economically as private persons or corporations. It is doubtful whether a single municipally owned utility, if operated under private management, would not render more efficient service and at an economy which would be sufficient in many cases to render a reasonable return upon the investment.

In the management of municipally owned utilities, employes, as a rule, are not engaged because of their qualifications, nor discharged because of their disqualifications. In the best managed municipally owned and operated public utilities, you frequently will find a certain ulterior political influence dictating to the management who shall and who shall not be employed in the service.

For the past eight years, both privately and municipally owned plants have been under the control of the railroad commission of Wisconsin. Mr. Halford Erickson, chairman of the Wisconsin commission, summarizes the result of his painstaking investigation of the conditions surrounding the operation of municipally owned utilities as follows:

(a) Municipal plants as a rule furnish poorer service than privately owned or operated utilities. On the whole, it is on a lower level than that of the corporations.

(b) Municipal plants are slow in responding to new discoveries and improved methods and often fail to properly supervise their meters and other equipment.

(c) Discriminations in rates were as flagrant in municipal as in private plants.

(d) The low rates charged by municipal plants are not often due to the low cost of production, but largely, in one way or another, up-keep and other costs are shifted from the consumer as such to the taxpayer as such.

e) Municipal plants are exceedingly backward in their methods of bookkeeping. In 1912, 161 out of 177 municipal plants in Wisconsin failed to keep their accounts in such a way as to disclose the true results of operation.

As an associate of Mr. Erickson for seven and a half years on the Wisconsin commission, I can verify these statements.

If municipal plants are subject to all the accusations that have been made against private plants which are considered a justification for their regulation by public authorities, certainly municipal authorities are not competent to deal with the subject or regulation.

The subject of regulation is exceedingly technical and needs the action of a highly trained body with personal centralized responsibility. This is true because of the combination of facts which have to be considered, and not because of any far fetched or fanciful suppositions as some of those who oppose regulation for one reason or another would have us believe. Questions involving rates and service simply present the public obligations of callings of a public nature—simply the full development of principles and duties which have been recognized in the common law for centuries.

Municipal councils are principally legistlative in character, change in personnel from election to election, and from their very nature, are incompetent to deal with administrative functions requiring special skill and training. This is so elementary to those who have had any experience in dealing with the operation of public service corporations or with their regulation from a public standpoint that it seems incredible that any agitation for municipal control could make headway in any community.

In this connection, let us consider, for example, the experience of Des Moines, Iowa. In the case of Des Moines Water Company against the city of Des Moines (decided in 1911, 192 Fed. 193) it appears that the city council of Des Moines had passed an ordinance fixing the rates of the water company, which filed a bill in equity to enjoin the enforcement of the ordinance on the ground that it was confiscatory, and it was so held upon the trial. However, what is of most interest, perhaps, is the following significant language used by the court:

> "The present expensive chaos should be brought to an end. It is known by all informed men that city councils necessarily adopt rates with but little or no investigation as to what rates ought to be fixed. The result is that we have ordinances fixing rates based upon but little intelligent effort for the ascertainment of the facts. Some of the states like New York, Massachusetts and Wisconsin, have state commissions of competent men, who give public hearings and do nothing behind doors nor in secrecy—a commission with no member interested as a taxpayer of the city, and with no member subject to the influences other than the ascertainment of the truth and the facts. Rates are thus fixed with which most fair minded people are ready to acquiesce. It is strange that we have no such legislation and no such commissions in Iowa."

On the preceding page (194) the court used the following words with regard to the matters before it:

> "This case illustrates the evils in connection with the fixing of rates by municipalities to govern public utility corporations. Neither party is properly chargeable with any dereliction, and yet the fact remains that by the time this case is decided by an appellate court at least four years will have elapsed from the passage of the ordinance until the matter is put at rest by the courts. It is uttterly impossible for a court to hear all cases similar to this, which requires from one to three months to hear the evidence after the issues are found. The Supreme Court of the United States has said that the seemly and orderly way to determine these matters is to refer them to a master in chancery to take the evidence and make reports on which the courts can act."

No doubt the appointment of a master is the best way to handle such matters when they come before the courts "de novo." Whether the ends of justice and the interests of the public will be better subserved by the findings of a master, however able, or an efficient public service body, which does nothing else, is left to the reader. To the writer's mind there can be only one answer.

However, Des Moines had another experience in its home rule. The council passed an ordinance providing for 90 cent gas. The matter was taken into the courts and there referred to a master. Both parties excepted to his findings, and the case came before the court in 1912, 199 Fed. 204. In this case the ordinance was not clearly confiscatory, and was sustained until after a trial. However, the court again took occasion to protest vigorously against the system in vogue under home rule. The writer does not wish to indulge in quotations to a tedious extent, but when the matter has been so well put that it seems well nigh impossible to improve on it, there seems to be no other course. The passage referred to follows (page 203):

> "I deem it appropriate to call attention to another phase of this litigation. The ordinance was adopted within a few minutes from its introduction. Quite likely it had been considered by the members in their individual capacities. But in open session it received but little consideration, and without the presence of anyone for the gas company, and every member voting to reduce the earnings had a direct personal and moneyed interest in thus reducing the rates. If a judge were to so act, his act would be absolutely void, because of the long time maxim, 'No man can judge in his own cause,' and this ought to apply to those who act in an administrative or legislative capacity. This litigation has cost both the gas company and city extravagantly large sums, most of which cannot be taxed as costs, nor recovered back by the party successful in the end. Much of this kind of litigation, and particularly all of the expense, would be avoided if Iowa, like so many of the others, including some neighboring states, had an impartial and city non-resident commission or tribunal, with power to fix these rates at a public hearing, all interested parties present, with the tribunal selecting its own engineers, auditors, and accountants. Too often we have selfish, partisan, prejudiced and unreliable experts engaged for weeks at a time at $100 or more and expenses per day, exaggerating their importance, and making the successful party in fact a loser. With all of our boasted advancement, Iowa is a laggard in this matter, and will continue as such until these rate makings are taken from the power of city councils. Appeals to the courts will seldom be taken from the findings of such a tribunal."

In connection with the charges of expense sometimes made against commission regulation by those who advocate home rule, the thoughtful reader's attention is especially called to what was said by the court with regard to that matter.

It is desirable that there should be certain standards of service, and that they should be uniform throughout the state, subject to modification, of course, when a local situation of an unusual nature demands it. Obviously there is little benefit to the public in a lower rate, if the utility is left free by offering a poorer standard of service to recoup itself.

In prescribing standards of service and fixing rates, the comprehensive experience of a state commission is of the greatest value in arriving at harmony and continuity of policy. When each municipality bargains for itself, as best it may through its franchises, not only is there likely to be confusion but the municipality is likely to be at a decided disadvantage.

As regards this question of confusion, in Calumet Service Co. vs. Chilton, 1912, 148 Wis. 334, the court refers to the case of La Crosse vs. La Crosse G. & E Co., 145 Wis. 408, and thus speaks of the interest of the legislature in passing the Public Utility Law (pages 362-3):

> "It was there held that the evident intention of the legislature expressed in unambiguous language, when read in the light of the situation dealt with, was by treaty with the owner of exist-

ing franchises to displace the old situation in its entirety, with all its complications, the growth of years, and we may add, with all its bitter controversies, the like of which is pictured in this case, and to substitute a new situation, all looking to unity, in practical effect, of a multitude of divers units, corresponding to the many outstanding franchises, and others in prospect, harmonizing by making them referrable to a single standard, to wit: the Public Utility Law, and to an ultimate single control, to wit: control by the trained impartial state commission, so as to effect the one supreme purpose, i. e. the best service practicable at reasonable cost to consumers in all cases, and as near a uniform rate for service as varying circumstances and conditions would permit—a condition as near the ideal probably as could be obtained."

Regulation by commissions has received the sanction of the courts in varying cases. Two Federal ones have already been quoted, and the fact is generally recognized that such is the case.

In closing, it is frankly conceded that purely local matters should be managed by the localities involved, and that no institution is perfect. If the method of regulation of our utilities is susceptible of improvement, it should be improved. The subject is one for care and study. As far as state regulation itself is concerned, the need of such regulation has become greater rather than less.

Final Sessions.

The last commercial session was held on Friday morning, being devoted to a discussion of a demonstration of a power sale as summarized on page 504, the general conclusion being that the report should be made by the engineer and presented by the salesman. The report of the nominating committee was accepted and the following officers elected:

J. F. Becker, chairman; E. A. Edkins, vice-chairman; C. J. Russell, vice-chairman; C. S. Littlefield, secretary; N. H. Boynton, W. F. Collier, J. C. McQuiston, E. A. Rockafellow and R. R. Young, executive committee.

The last general and executive session was devoted to a consideration of the report of the Committee on Company Sections, Company Section Work, and the Electric Vehicle.

J. M. Wakeman, general manager Society for Electrical Development, briefly reviewed the work of the society and told of the plans for an electrical prosperity week in December.

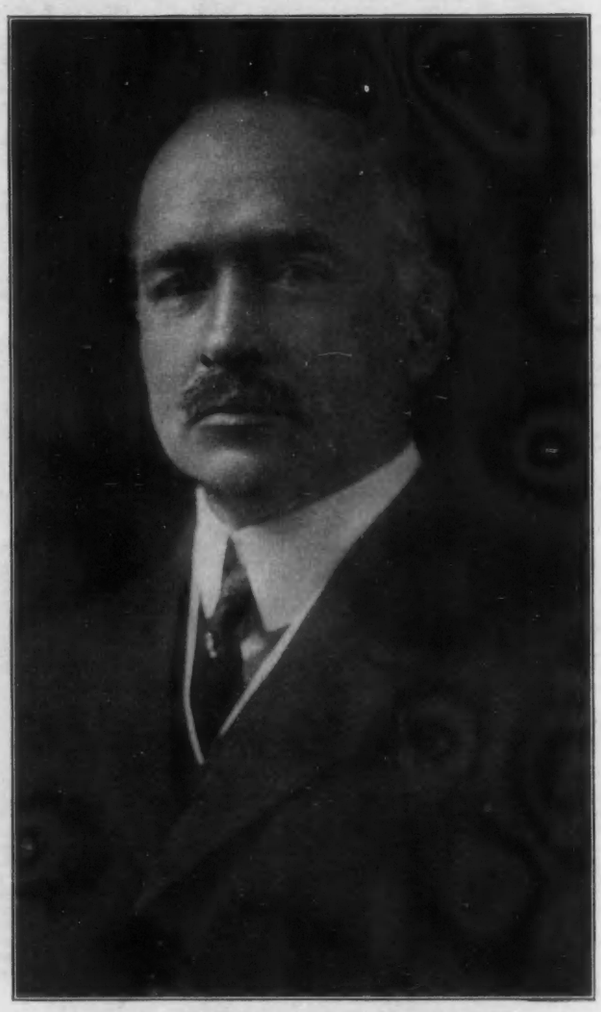
The final reports on memorials, resolutions, nominating committees, etc., were received and accepted, and the following officers elected:

President—E. W. Lloyd, New York City.
Vice-President—H. A. Wagner, Baltimore.
" " W. F. Wells, Brooklyn.
" " A. H. Ballard, Los Angeles.
" " R. S. Orr, Pittsburg.
Secretary—T. C. Martin.

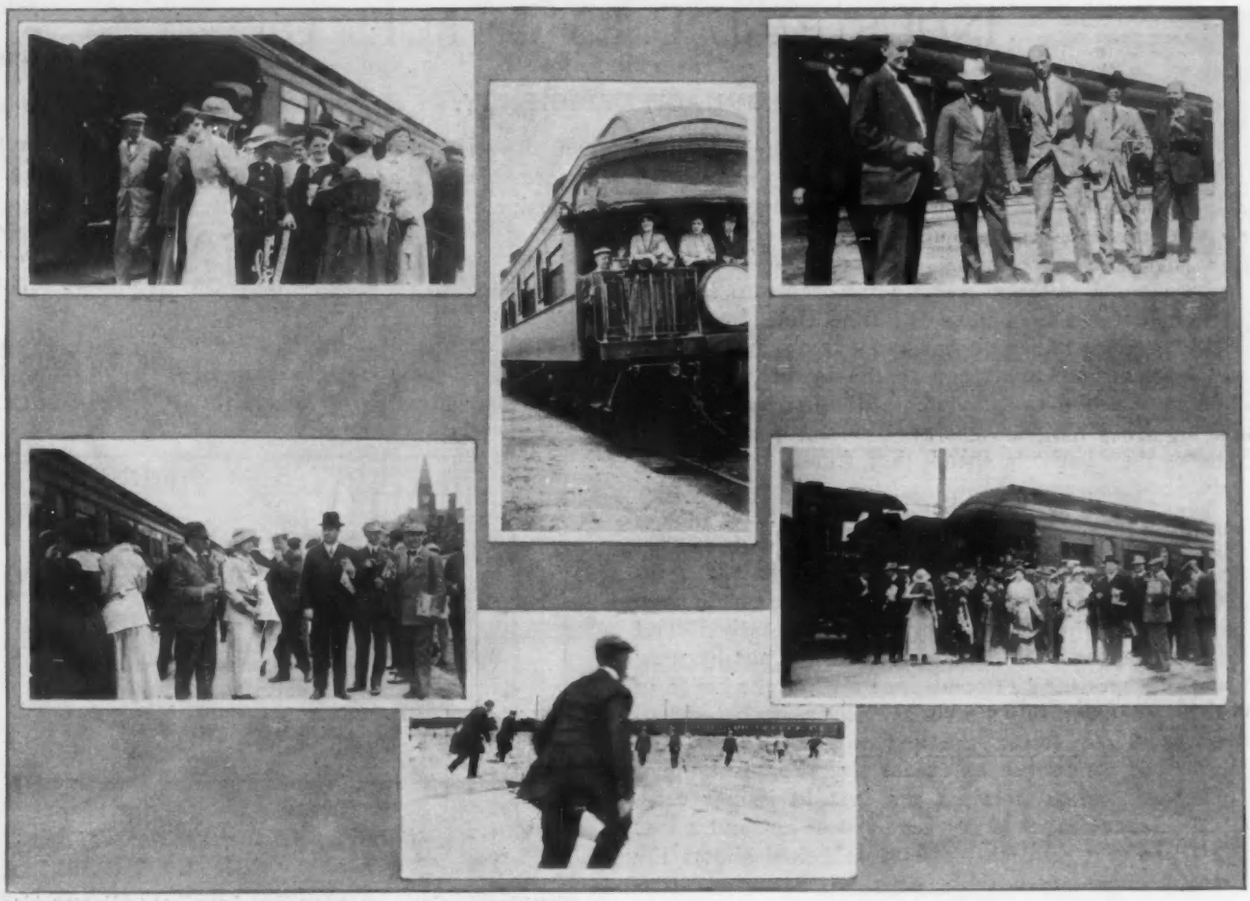
The constitution was amended to allow the formation of a manufacturers' section, should ten or more Class D members so desire.

There being no further business the convention adjourned at 1 p. m., June 11, 1915.

E. W. Lloyd, the New President.



H. A. Wagner, First Vice-President.



A Few Gems from the Camera of Frank L. Gale, Who Was in Charge of the Blue Special to the N. E. L. A.

Jovian Night on the Zone.

On Tuesday night the Jovians held a great parade and rejuvenation on the Zone at the Exposition. On account of the spectacular features of the parade and because of the wide interest it created this event is believed to have brought the Jovians more favorable public attention than has ever been accorded them before. The occason was made the more memorable by the presence of Homer E. Niesz, Reigning Jupiter.

Soon after the National Electric Light Association delegation reached the Zone the parade was started, being headed by electric automobiles carrying Jupiter Homer E. Niesz, Tribune T. E. Collins and Stentor A. E. Morphy, President H. H. Scott and Secretary T. C. Martin. Then followed a series of fantastic and grotesque aggregations of neophytes placed in all sorts of ludicrous positions by their captor-friends. Great ingenuity and effort had been expended upon all the floats; red fire and red devils were greatly in evidence, and many of the Zone concessionaires were represented. The parade was in twenty-eight sections, each in charge of a team made up of Jovian members of some local firm or organization. The Los Angeles and the Sacramento delegations were present in force and contributed greatly to the spirit of the occasion. Prizes were awarded to the Western Electric and American Ever-Ready teams.

After the parade forty-three victims were sacrificed upon the altar of co-operation at a rejuvenation held in Toyland. The degree team was made up of the following:

Jupiter, A. E. Drendell; Neptune, C. C. Hillis; Vulcan, A. V. Thompson; Mars, E. A. Wilcox; Hercules, W. C. Wurfel; Apollo, Harry Woodward; Pluto, George E. Gray; Mercury, Murray Orrick; Avrenim, L. A. Schloss; Imps, J. A. Herr, William Tardiff, Willis Dunbar, Edward Wolf.

After the rejuvenation Jupiter Homer E. Niesz welcomed the new additions to the order and complimented Tribune Collins and his co-workers upon the great success that had been achieved.

The following candidates were rejuvenated:

A. J. Anderson, Sangamo Electric Co.
C. G. A. Baker, Baker-Joslyn Co.
F. E. Boyd, General Electric Co.
T. J. Bennett, Rex Electric.
A. F. Brown, Gamewell Fire Alarm Co.
J. E. Crilley.
H. A. Case.
A. E. Clarke, City Electric Co.
G. A. Cleary, Board of Fire Underwriters.
R. C. Coxhead, Account-O-Graph Co.
J. W. Caswell, Department of Electricity.
A. J. Calloway, Western Electric Co.
R. E. Dryer, Western Electric Co.
E. J. Duryer, H. R. E. Co.
W S. Dunlap, Jr., City Electric Co.
Thomas Finnigan, Pierson-Roeding Co.
T. Fazario, Belmont Electric Co.
W. G. Gordon, General Electric Co.
H. F. Hartzell, Baker-Joslyn Co.
J. A. Heroux, Great Western Power Co., Oakland.
C. L. Huyck, Western Electric Co.
H. H. Hoxie, Electric Ry. Mfrs. Supply Co.
S. G. Jackson, Berkeley Elect. Const. Co., Berkeley.
P. J. Kent, Western Electric Co.
L. A. Lundstrom, H. W. Johns-Manville Co.
F. J. Lyons, American Ever-Ready Co.
A. E. Larson, Johns-Manville Co.
W. E. Lee, Westinghouse Electric & Mfg. Co.
F. H. Mills, Electric Appliance Co.
A. Morbio, Great Western Power Co.
R. F. McDonald, Holabird-Reynolds Co., Oakland.
J. McKee, Great Western Power Co., Oakland.
T. H. Neimes, Pacific States Electric Co.
R. F. Norling, Electrical Contractor, Oakland.
H. S. Pechart, H. W. Johns-Manville Co.
G. D. F. Smith, Electric Motor & Machine Co.
E. G. Standefer, City Electric Co.
O. A. Schlessinger, United Light & Power Co.
G. A. Sherman, Western Electric Co.
G. R. Thomas, The R. Thomas & Sons Co.
J. W. Thompson, H. W. Johns-Manville Co.
H. P. Treat, Western Electric Co.
D. Trego, Trego Electric Co.
A. Youngholm, Westinghouse Lamp Co.
W. F. Zimmerman, Electric Ry. & Mfg. Co.

INDUSTRIAL USES OF FUEL OIL

BY F. B. DUNN.

FURNACE EFFICIENCY.

Many engineers are satisfied when their oil fires show a bright clear flame without smoke. They overlook the fact that much unnecessary air may be passing through the furnace, under these conditions; and if low efficiencies are the result, they lay the blame on the oil burner, without making any effort to investigate or better the conditions. The time has come, however, when all engineers should pay more attention to scientific combustion. It is impossible to know when combustion is complete (without excess of air) without the use of flue gas analysis instruments; and as these are relatively cheap, they should be a part of every fire-room equipment.

The result of complete combustion of carbon is carbon dioxide, CO_2. When completely burned fuel consisting of 100 per cent carbon will show a volumetric percentage of 20.7 CO_2 in the furnace gases. Fuel oils contain a high percentage of carbon, and the average per cent of CO_2 obtained in oil burning furnaces where furnace conditions are watched is from 13 to 14 per cent, the theoretical maximum being 15.6 per cent. The lower the percentage of CO_2, the greater the waste due to excess air. For example if the amount drops from 13 per cent to 10 per cent, it is an indication of 54 per cent excess air, and a loss of 2.9 per cent of fuel. The table below shows the corresponding losses that occur when various percentages of CO_2 are indicated in the flue gases.

Table.

CO_2 and Fuel Losses.

Per cent CO_2	Per cent excess air.	B.t.u. loss.	Per cent fuel loss
15.6	0	0	.0
15	5	75	.4
14	10	186	1.
13	18	317	1.7
12	28	447	2.4
11	40	633	3.4
10	54	856	4.6
9	70	1118	6.
8	93	1435	7.8
7	120	1900	10.2
6	152	2460	13.2
5	198	3205	17.2
4	273	4380	23.5
3	396	6340	34.
2	635	10150	54.5
1	...	.....	....

To be able to conduct the tests necessary to determine the efficiency of combustion, the engineer should be provided with a practical gas analysis apparatus. There are many such instruments on the market. The manually operated type gives oxygen (o), CO, and CO_2, while the automatic CO_2 recorder indicates at certain intervals the percentage of CO_2 present in a sample of the flue gases, and automatically registers it on a chart.

In using these instruments, the sampling tube should be inserted at the base of the chimney, or in the last pass in the boiler, as near as possible to the point where the gases leave the heating surface. In order to determine the air leakage, a reading should also be taken at the furnace and compared with the reading from the last pass; the furnace should show a little higher percentage of CO_2. Careful attention should be given to the leakage of air through boiler settings, and analyses should be taken comparing the CO_2 present to compare the difference about six inches from the wall with the amount near the center of the furnace. Such a comparison will give a good idea of the leakage that is taking place through cracks in the walls, or through porous bricks. A saving of over 5 per cent has been effected by stopping such leaks in a boiler setting that was apparently in perfect condition.

A draft gauge should be used while making flue gas analyses, for a slight variation of the draft entering the furnace, raises or lowers the percentage of CO_2.

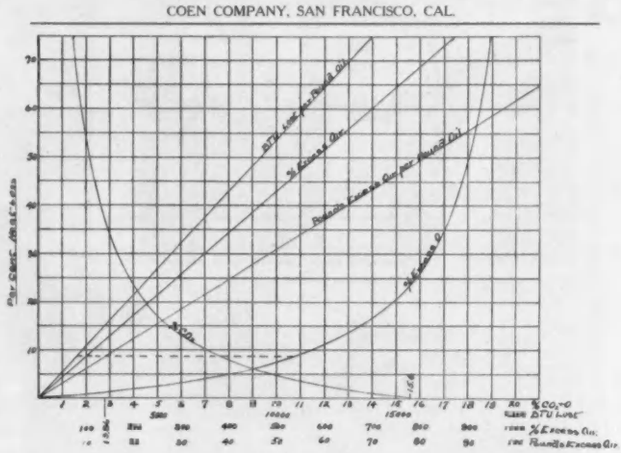


Fig. 95. CO_2 Curve Showing Heat Loss Due to Excess Air.

Calculated on following conditions: Oil as fired—18,633 B.t.u., 84.73 per cent carbon; 11.74 per cent hydrogen; 1.06 per cent sulphur; 5 per cent nitrogen; .87 per cent oxygen; .7 per cent moisture and .4 per cent sediment. Atmospheric temperature, 55 degrees F.; humidity, 88, stack temperature, 500 degrees F., Kern oil at 16 degrees B.

If the percentage of CO_2 is found to be low, indicating excess air, the draft should be adjusted until the percentage of CO_2 has increased.

Apparatus for Flue Gas Analysis. The Orsat apparatus, illustrated in Fig. 96, is generally used for analyzing flue gases. The burette A is graduated in cubic centimeters up to 100, and is surrounded by a water jacket to prevent any change in temperature from affecting the density of the gas being analyzed.

For accurate work it is advisable to use four pipettes, B, C, D, E, the first containing a solution of caustic potash for the absorption of carbon dioxide, the second an alkaline solution of pyrogallol for the absorption of oxygen, and the remaining two an acid solution of cuprous chloride for absorbing the carbon monoxide. Each pipette contains a number of glass tubes, to which some of the solution clings, thus facilitating the absorption of the gas. In the pipettes D and E, copper wire is placed in these tubes to re-energize the solution as it becomes weakened. The rear half of each pipette is fitted with a rubber bag, one of which is shown at K, to protect the solution from the action of the air. The solution in each pipette should be drawn up to the mark on the capillary tube.

The gas is drawn into the burette through the U-tube H, which is filled with spun glass, or similar material, to clean the gas. To discharge any air or gas in the apparatus, the cock G is opened to the air and the bottle F is raised until the water in the

burette reaches the 100 cubic centimeters mark. The cock G is then turned so as to close the air opening and allow gas to be drawn through H, the bottle F being lowered for this purpose. The gas is drawn into the burette to a point below the zero mark, the cock G then being opened to the air and the excess

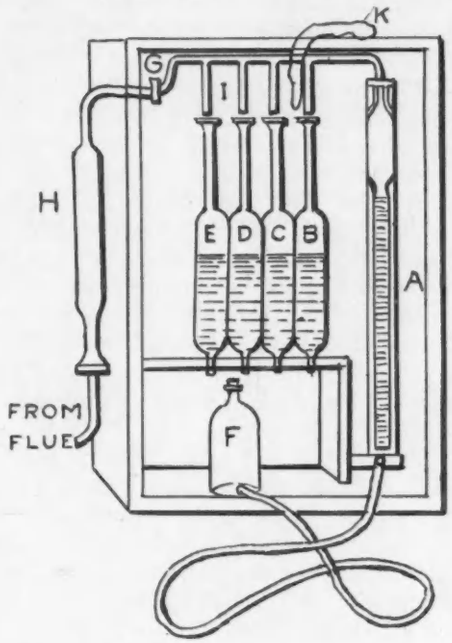


Fig. 96. Orsat Apparatus.

gas expelled until the level of the water in F and in A are at the zero mark. This operation is necessary in order to obtain the zero reading at atmosphere reading pressure.

The apparatus should be carefully tested for leakage, as should also all connections leading thereto. Simple tests can be made for example, if, after the cock G is closed, the bottle F is placed on the top of the frame for a short time and again brought to the zero mark, if the level of the water in A is above the zero mark, a leak is indicated.

Before taking a final sample for analysis, the burette A should be filled with gas and emptied once or twice to make sure that all the apparatus is filled with the new gas. The cock G is then closed and the cock I in the pipette B is opened, and the gas driven over into B by raising the bottle F. The gas is drawn back into A by lowering F and when the solution in B has reached the mark in the capillary tube, the cock I is closed and a reading is taken on the burette, the level of the water in the bottle F being brought to the same level as the water in A. The operation is repeated until a constant reading is obtained, the number of cubic centimeters being the percentage of CO_2 in the flue gases.

The gas is then driven over into the pipette C and a similar operation is carried out. The difference between the resulting reading and the first reading gives the percentage of oxygen in the flue gases. The next operation is to drive the gas into the pipette D, the gas being given a final wash in E, and then passed into the pipette C to neutralize any hydrochloric acid fumes which may have been given off, thus increasing the volume of the gases and making the reading on the burettes less than the true amount. The process must be carried out in the order as the pyrogallol solution will also absorb carbon dioxide, while the cuprous chloride solution will also absorb oxygen.

As the pressure of the gases in the flue is less than atmospheric, they will not of themselves flow through the pipe to the burette. For rapid work a rubber bulb aspirator connected with the air outlet of the cock G will enable a new supply of gas to be drawn into the pipe, the apparatus then being filled as already described.

Another form of aspirator draws the gas from the flue in a constant stream, thus insuring a fresh supply for each sample.

The analysis made by the Orsat apparatus is volumetric; if the analysis by weight is required, it can be found from the volumetric analysis as follows: multiply the percentages by volume by either the densities or the molecular weight of each gas, and divide the products by the sum of all the products; the quotients will be the pencentages by weight. For most work sufficient accuracy is secured by using the even values of the molecular weights, given below:

Carbon dioxide	44
Carbon monoxide	28
Oxygen	32
Nitrogen	28

(To be continued.)

WATER POWER CONGRESS.

That a comprehensive program for the development of the water power and the settlement of affiliated land problems of the West advising Congress of the wishes of the residents of this section will be prepared at the conference of delegates of 13 states in Portland, September 21, 22 and 23, is the opinion of Governor Withycombe, who has charge of the arrangements. The delegates appointed to represent Oregon and numerous other persons who realize the necessity of the West taking a united stand to safeguard its interests agree with Mr. Withycombe. Citing legislation pending in Congress designed to encourage the development of the water power resources of the West, a possiblity of the federal government retaining a preferential reversionary interest in the powers developed, and giving the states one-half or less of the prospective profits, the recent legislature adopted a resolution providing for the conference and urging the federal government to relinquish to the states the title to lands needed for water power development.

Governor Withycombe will call a meeting of the Oregon delegates in the near future to outline a program for the conference, and when all delegates are appointed he will keep them fully informed as to what may be expected at the meeting. Experts in water power development and other prominent men will make addresses, aiding in a solution of the land and water problem.

The injustice of the flat rate for electric light service has been sustained by the Superior Court of Oregon, Chief Justice Moore holding that the Eastern Oregon Light & Power Company was within the terms of its franchise when it abandoned a flat rate and installed meters to determine electric light charges in Haines.

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Change of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to noon of Monday dated Saturday of the same week. Where proof is to be returned for approval, Eastern advertisers should mail copy at least thirty days in advance of date of issue.

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Service the Keynote

The National Electric Light Association has long been recognized as an organization that acts as an effective medium in applying in a practical way to the commercial life of a great industry all the knowledge and traits of man that bear upon the subject of electric lighting and its countless associated industries.

All societies have their fields of usefulness. The society of pure science has its scope of activity in delving into unknown realms in an effort to search out and make of record the truths of creation irrespective of their possible usefulness to mankind; the engineering society sifts the chaff from the wheat, so to speak, and in highly technical reasoning, translatable only to the initiated, puts to practical application the useful scientific knowledge acquired in the progress of art; but this great electrical association, which has held its convention during the week, collates and correlates all scientific and engineering data of usefulness to its membership, steps it down to the understanding of the practical business man.

It is interesting and instructive to note how the proceedings of this great society reflect so truly the life and activities of electrical evolution. First came the day of promotion and exploitation. Hence in the earlier proceedings of the society may be found much that was helpful and useful in safely launching new electrical activities. Next came the day of commission regulation, and consequently we find the proceedings of the society during that period flooded with references and cross references on this all important subject. And finally has now come the day of fruitage.

How truly the program of the convention just closing at San Francisco emphasizes this point. From the president's address down through the commercial, technical, hydroelectric and rate research committee reports all reflect the keynote of this great and inspiring convention—service.

Social, educational, economic and industrial unrest have largely characterized the ten-year period since the St. Louis Exposition. Communities, states, nations—yes, even the world as a whole—have been groping for a solution of problems along all such lines. In view of this fact, then, no organization can be truly characterized as really worth while, even in a commercial way, that does not aid, in a sense, in meeting the needs of the world, of giving the greatest possible help to the state along the lines of highest development.

In the light of present day trend of affairs, the quality of service rendered to the state by an organization marks success or failure for that organization and for the interests it represents.

The remarkable addresses and papers that have been delivered during the present session indelibly stamp the leaders of the great electrical industries as deeply imbued with the efficacy of service rendered as a factor of prime importance.

Let us, then, in the words of an ancient seer, "press forward to the mark of the high calling," and, significant of certain success, let us emblazon upon every act the watchword—service.

Efficiency in the Office Force

In a recently published dictionary of thoughts setting forth some eighteen thousand sayings of two thousand of the world's greatest thinkers of ancient and modern times nothing is said on the subject of efficiency. The discussion jumps from economy, education to effort and egotism. All of these subjects have much to do with efficiency, for they aid in attaining the power of producing the effect intended. It has remained for the most recent of years, nevertheless, to evolve a science wherein all the factors that go toward aiding in this power to produce the effect intended are correlated and analyzed so that man may be the better enabled to accomplish the tasks of life with less expenditure of human effort.

Much discussion has of late taken place relative to improved and efficient methods of doing office work. In these days of retrenchment and marking time, the cost of handling the routine of the office is of prime importance.

A few suggestions boiled down from the investigation of the Efficiency Society along this line may prove timely to busy utility managers in roughly checking up their own efficiency regime in office management.

In the first place indecision on the part of the executive is a potent waste. He should at all times have a clear perception in his own mind of the work to be accomplished before starting an employe on the task.

Again, the employe is entitled to definite instructions. State the limit to which he is to exercise judgment and the method of performing the task. See that the employe thoroughly understands what he is to do.

In the general organization, the functionizing of the men at the head of it is a matter of great importance. No person, executive or employe, is adequately fitted for all kinds of work. Pick the right man for the right place.

Develop your organization so that it will not be seriously crippled by the retirement of any individual. No man should be indispensable.

See that the physical condition of employes is as perfect as possible. The mind will not function properly if the body is not at ease.

It is important for the executive to inspire loyalty to himself. The loyalty of the average person is to a leader, not a movement, to a concrete personality, not an abstract principle.

Train your men in correct habits of work. The formation of good habits tends to standardize work and standardization of work is one of the greatest aids to the efficient dispatch of it.

No experience is of importance unless it is capitalized. Any experience which shows more efficient methods or better results should be utilized by the establishment of procedure to secure a repetition of it.

Avoid distraction and confusion in surroundings of employes. The brain receives every moment an enormous overwealth of stimulation and appeals for attention elsewhere than upon the work in hand lessens efficiency.

Whenever practicable the work of employes should be reviewed by other employes in order to secure the detection of errors.

And finally remember that the way to get office work done day after day is not to "jam it through." No machine, office or other, can stand the strain of frequent, unexpected racing. Make of your office force a perfect, well-oiled machine free from friction and capable of running on full load during all the hours reasonably required in the performance of duty.

Gas Power as a Prime Mover

The most remakable observation to be made upon the report of the committee on prime movers, submitted to the convention of the National Electric Light Association, is the space and emphasis devoted to the possibilities of gas power as a prime mover, with especial reference to engines of the Diesel type. The subject is one of keen interest to Western power men, due to the ever increasing production of crude petroleum in this locality. On the face of its extremely simple thermodynamic cycle of operations the Diesel engine may eventually prove a worthy foe to the steam-operated power plant, for it presents a means of transferring the energy latent in the oil directly into mechanical energy. In the steam-operated power plant it is necessary first to burn the oil beneath the boilers in order to produce the power driving fluid—steam. The Diesel engine, on the other hand, cuts the Gordion knot, as it were, and performs all of the necessary energy transforming operations directly in the engine cylinder.

While a decade of successful Diesel engine operation abroad has put this type of prime mover on a firm and established bases in many foreign localities, American engineers, especially those of the West, have been exceedingly loath to admit its importance.

The chief reason for this apathy has been due to the conservatism always shown in adopting new and untried methods. Underlying this reason there has, however, existed a firm conviction that the heavy asphaltum oils of California and Mexico could not be successfully injected into the engine cylinder, which, of course, would prove a serious difficulty in efficient operation. During the past year American manufacturers have devoted considerable attention to the design of fuel nozzles that now enable Diesel engines to operate on oils containing over fifty per cent of asphalt.

Economy tests are of record which give a fuel consumption of but .42 to .48 lb. per brake h.p.-hr. So well established has the supremacy of the Diesel now become in economy of fuel oil consumption that future effort in design will undoubtedly largely be devoted to increasing the simplicity in design and permanence or durability in construction rather than to further improve on this feature.

Installations driving electric generators in sizes up to 500 horsepower are of frequent occurrence, and one American firm is now ready to deliver units as high as 1500 h.p. capacity. The unprecedented advance of the steam turbine in recent years from comparatively small units to the giant 35,000 kw. unit of the present day is illustrative of the possibility of the Diesel and similar types due to the enormous yield of crude petroleum and especially due to the assured permanency of this kind of fuel for future power generators.

PERSONALS

N. H. Boynton, advertising manager National Lamp Works, Cleveland, Ohio, is at San Francisco.

F. N. Averill of the Fobes Supply Company, Portland, Ore., and Seattle, Wash., is at San Francisco.

J. Van Buskirk of the Minerallac Electric Company of Chicago, was in San Francisco the past week.

C. V. Schneider, electrical contractor and dealer of Sacramento, Cal., was at San Francisco during the past week.

Raymond Ackermann, specialty manager of the Capital Electric Company, Salt Lake City, Utah, is at San Francisco.

P. S. Benjamin of the Holabird, Reynolds Company, San Francisco, is on a business trip through the Sacramento Valley.

J. P. Sprunt of the Salt Lake City sales department of the Westinghouse Electric & Manufacturing Company, is at San Francisco.

A. Jackson Marshall, secretary of the Electric Vehicle Association of America, New York City, was at San Francisco this week.

F. H. Leggett, manager of the Western Electric Company, San Francisco, has returned after a business trip to Portland and Seattle

W. J. Phillips, division commercial superintendent of the Pacific Telephone & Telegraph Company, Portland, Or., is at San Francisco.

C. N. Chamberlain, manager of the arc lamp department at the Lynn works of the General Electric Company, is at San Francisco.

E. Pechin Hyde, director Nela research laboratory, National Lamp Works of the General Electric Company, is at San Francisco.

Lucius B. Andrus, general superintendent Indiana & Michigan Electric Co., South Bend, Ind., was a visitor at the convention and Exposition this week.

H. E. Sanderson, Pacific Coast manager of the Bryant Electric Company, San Francisco, will leave on an Eastern business trip in the near future.

R. W. Murphy of the Los Angeles branch of the Westinghouse Lamp Company, who has been making a business trip through the Pacific Coast States, is at San Francisco.

A. S. Hewyard, manager of the electrical department, Cotton Neil & Co., Honolulu, H. T., who has been visiting Eastern electrical manufacturing centers, is at San Francisco en route home.

E. L. Barnes, Pacific Coast manager American District Steam Company at Seattle, and **H. C. Kimbrough,** district manager and director at Chicago, were at San Francisco during the past week.

R. J. Russell, sales manager for the Century Electric Co., of St. Louis, was in attendance at the National Electric Light Association convention during the past week, being accompanied by Mrs. Russell.

W. D. Peaslee, consulting engineer and associated with the department of electrical engineering at the Oregon Agricultural College, Corvallis, Ore., was in attendance at the N. E. L. A. convention during the past week.

W. W. Freeman, president of the Union Gas & Electric Co., of Cincinnati, Ohio, and chairman of the Public Policy Committee of the National Electric Light Association, addressed the weekly luncheon of the Electrical Development and Jovian League last week.

Henry L. Doherty, president of the Society for Electrical Development, **James M. Wakeman,** general manager, and **George B. Muldaur,** manager of field co-operation, are at San Francisco in conjunction with the appointment of a Pacific Coast representative for the society.

Samuel Insull, president of the Commonwealth Edison Company of Chicago and a director of the Pacific Gas & Electric Company, was the guest of honor at a dinner given by the officials of the latter company at the Bohemian Club, San Francisco, on June 9th, 115 prominent electrical men attending the N. E. L. A. convention being invited.

E. L. Callahan, district manager of the Westinghouse Company at Chicago, and **W. H. Robinson,** commercial engineer of the same company at New York, have been making a business trip of the Pacific Coast and were at San Francisco the past week. They left for the East together with **W. C. Wurfel,** Pacific Coast manager of the Westinghouse Lamp Company, Friday.

MEETING NOTICES.

Northwest Electric Light and Power Association.

The Northwest Electric Light and Power Association has changed the date of their Portland (Oregon) convention from September 15-17, 1915, to September 8-11, 1915, in order not to conflict with the A. I. E. E. convention to be held in San Francisco.

Portland Jovian League.

The weekly Jovian lunch was held Friday noon, June 4, at the Benson Hotel. This was an "Electrical Vehicle Day" and the chairman of the day was Will Spaulding. The speakers of the day were L. R. Reese, sales manager of the Detroit Electric, who read a paper on "Pleasure Cars"; Mr. A. M. Stanton of Meier & Frank Company, who read another paper on "Delivery Service With Electric Trucks," and Mr. E. A. West, efficiency engineer of the Portland Railway, Light and Power Company, who outlined the report of the Massachusetts Institute of Technology on "Electric Vehicle Operation."

A guessing contest was participated in by the members in attendance at the luncheons and consisted of guessing the probable number of electric vehicles which should be in use in Portland and the amount of annual income the central stations would derive from their use, with power figured at 2½ per kw.-h. The correct answer was arrived at by applying statistics available in similar cities and was placed at 968 cars and $158,000 annual income. Mr. C. E. Warner had the nearest guess and the prize was the use of an electric vehicle for any Sunday afternoon, in order to convince him of their merits.

Later Mr. Stanton's paper will be published, it containing actual operating data on the delivery system of a modern department store using electric trucks.

Electrical Development and Jovian League.

F. H. Leggett, president of the Electrical Development and Jovian League of San Francisco, is finishing his term of office with a series of remarkably strong meetings. On June 2, James M. Barry, as chairman of the day, introduced Mr. Paul Ost, electrical engineer with the city engineer's office, who traced the development of San Francisco's fire protective system and described the new installation. A complete illustrated description of these will be given in an early issue of the Journal.

On June 9th Mr. John A. Britton presided as chairman of the day, there being an attendance of 95 members and guests. Prominent among the latter was Homer E. Niesz, Reigning Jupiter of the Jovian Order, who in a few words spoke of the great things being done by Jovians. W. W. Freeman, president of the Union Gas & Electric Co., of Cincinnati, whom Mr. Britton introduced as the "wandering dynamo," spoke in a most interesting manner about "Co-operation." He believes in co-operation, but maintains that it does not mean subjection,—having the other man do what we want him to do. The jobber, contractor or dealer should not be subject to the central station. Neither is co-operation fully defined as teamwork, where there is necessarily a dominating mind and all are not working together. But it does

mean purposeful, united action for the development and success of the industry. The three elements which constitute to make co-operation are mutual acquaintance, confidence and understanding, each being an outgrowth of the other. A broad understanding of differences of opinion is particularly essential.

The Jovian Electrical League of Southern California.

The weekly luncheon of the League, held at Christopher's, Los Angeles, on June 2, was attended by about 125 Jovians and their friends. The chairman of the day, H. H. Fogwell, requested Mr. S. M. Kennedy of the Southern California Edison Company to introduce Mr. E. W. Lloyd of Chicago, which he did most gracefully, by referring to Mr. Lloyd as the "sure-to-be" next president of the N. E. L. A., an honor which he well merited and a position which he will honor by his occupancy. Mr. Lloyd referred to the close bond which exists and should be strengthened between the Jovian Order and the central station interests, for their ultimate object, namely, to popularize and increase the use of electricity, was identical and the success of the one branch is closely interlinked with and largely dependent upon the efforts of the other. He spoke in most complimentary terms about the wonderful 60 per cent load factor of the local Edison Company and how much the Eastern and Middle West central station men might learn from Western methods, especially along commercial lines. Such high load factors he said, are an encouragement to capital and, in consequence, to the public as well as the employes of the companies. He urged his hearers to join one of the sections of the N. E. L. A. and made it plain that everyone in the electrical industry can be benefitted by the reading of the reports and discussions, for after all, the problems to be solved are nearly identical in their general scope, all over the country. He mentioned the astonishing fact that the Commonwealth Edison Company sent out during last January 26,000 bills for less than $1 and in July a larger number of fifty-cent bills. He closed his highly interesting talk, with an earnest plea for co-operation among all workers in the electrical industry. Mr. A. M. Irwin, assistant to the treasurer of the Westinghouse Company, of San Francisco, addressed those present on the importance and vicissitudes of the credit man, and assured his hearers that the credit manager is very seldom a credit damager, as is the popular belief among salesmen. Mr. R. H. Ballard most earnestly urged the electrical men of Los Angeles to attend the N. E. L. A. Convention, not only for their own enlightenment, but in view of a duty they owe to their companies and the industry at large. A splendid musical program was rendered.

Oregon Society of Engineers.

A special meeting of the Oregon Society of Engineers was held in Room "B" of the Public Library Thursday evening, June 3, for the purpose of having William H. Daly, Commissioner of Public Utilities of the city of Portland, speak on the subject of the "Water Meter Question." The question of the purchase of 5000 more water meters for the city of Portland is to be voted upon at the coming municipal election and Mr. Daly is advocating the purchase, while there is a lot of opposition on the ground that it is a useless expense at this time.

Mr. Daly brought out the following points with the assistance of Engineer Clark of the Water Bureau:

The capacity per 24 hours of the two pipe lines from Bull Run river to Portland is 65,000,000 gallons per day (24 hours).

There are 128 miles of small size mains, less than 4-inch, in the city, and meters would conserve the water and prolong the life likely five years.

To replace these mains would cost $900,000. The cost of meters would be $100,000.

In one section of Portland tests have been carried on to prove the water saving, as follows:

With 8000 services, population 42,000, and 1300 meters installed, the daily (24 hours) consumption for the metered services is 41.8 gallons per capita.

The daily (24 hours) consumption for the unmetered services is 86 gallons per capita. The average consumption for unmetered services has reached 175 gallons per capita per 24 hours.

The maximum consumption of water in Portland has reached 46,000,000 gallons per 24 hours, the average consumption being 30,000,000 gallons per 24 hours. The estimated consumption when all services are metered would be 21,000,000 gallons per 24 hours. At present there are 14,000 meters installed.

The low water period on the Bull Run river comes at the time of the maximum consumption of water in the city.

The minimum flow of the river has decreased to as low as 67 second feet, which has caused the drawing on the local storage reservoirs to make up the difference.

In 1918 on this basis it will require one-half the storage capacity to "tide" over this period of drought.

There are no storage facilities on the Bull Run river, the water being taken into the pipe lines by means of a wing dam.

If storage were provided, there are facilities to store a large amount of water at the intake of the pipe lines, and then all the year the pipes could be kept full to their maximum capacity, if necessary, which is 105 second feet, or 65,000,000 gallons per 24 hours.

The surveys for storage reservoirs have been made, but no money is available for construction.

A resolution was passed giving the president and secretary power to draft a suitable resolution indorsing the purchase of the meters at the present time, as they deem it in the interest of economy.

NEWS OF CALIFORNIA RAILROAD COMMISSION.

The commission rendered a decision granting authority to the Pacific Gas & Electric Company to issue 19,266 shares of its common stock of the par value of $100 per share.

The commission has rendered a decision authorizing the Home Telephone & Telegraph Company of Santa Barbara to renew a promissory note in the sum of $10,000, payable to the Commercial Bank of Santa Barbara, and to refund a promissory note in the sum of $15,000, held by the Santa Barbara Savings & Loan Bank, and to pledge as collateral security for the payment of the note $27,000 of its first mortgage bonds.

The Commission has extended the time within which the Pacific Electric Railway Company may issue $1,554,000 of its refunding mortgage fifty-year gold bonds from June 1, 1915, to and including January 1, 1916. These bonds are the unsold portion of the $2,942,000 of bonds authorized by the Commission on November 23, 1914.

The Commission has given the Oakland, Antioch & Eastern Railway the option of renewing or extending a note in favor of the Union Trust Company of San Francisco in the sum of $100,400.

The Commission has issued an order authorizing the San Diego Home Telephone Company to issue a promissory note to the American National Bank of San Diego in the sum of $20,000.

The Commission has issued a supplemental order authorizing the Santa Barbara Gas & Electric Company to issue $11,000 of its first mortgage 6 per cent 30-year gold bonds.

The Commission has issued an order authorizing C. H. L. Ghriest, Jr., to mortgage his electric utility property at Banning, Riverside county, to the Sierras Construction Company, to secure a promissory note in the sum of $600.

NEWS NOTES

INCORPORATIONS.

RIVERSIDE, CAL.—Colorado River Telephone Company, $25,000, subscribed $300, by Floyd Brown, R. F. Hopkins, S. D. Kamrar et al.

ILLUMINATION.

OLYMPIA, WASH.—Bids for lighting the city will be opened July 7th.

FLORENCE, ARIZ.—E. R. Brackett has been granted a franchise for electric power, light and water works.

SANTA ANA, CAL.—Street lighting for the Buena Park district has been voted down by the board of supervisors.

OLYMPIA, WASH.—The council has granted a franchise to W. W. Manier to establish a plant and furnish power and light in the city.

SODA SPRINGS, IDAHO.—Bonds in the amount of $15,000 were voted for the installation of a municipal electric lighting plant.

SAN JOSE, CAL.—Plans and specifications for the Milpitas Lighting District have been adopted and bids called for lighting. Bids are to be opened June 21st.

SEATTLE, WASH.—An ordinance has been passed granting Burns Lyman Smith, the right to construct conduits for electric light and power in certain streets.

SAN MATEO, CAL.—The Pacific Gas & Electric Company has applied for a permit to lay an 8 inch gas main from San Francisco to its storage reservoir in Redwood City.

MARTINEZ, CAL.—H. R. Edwards, representative in Contra Costa county of the Contra Costa Gas Company, stated that gas service will be offered residents of Martinez by August at the latest.

CALEXICO, CAL.—The Holton Power Company submitted a proposition for an adequate lighting system, embracing the business district, residence section, and outlying districts, which is under consideration by the city trustees.

HOLBROOK, ARIZ.—An electric light and power plant will soon be located in this city, by terms of an agreement made between W. H. Clark, who holds a franchise for such a plant and other Gallup men for financing and building the plant.

GOLD HILL, ORE.—At a referendum election the question of the installation of a street lighting system and for the installation of an electric pumping system and supplying electric current for the operation of the system by the California-Oregon Power Company was defeated.

BOZEMAN, MONT.—A resolution of intention to create special improvement lighting district No. 91 has passed the council for street lighting in Main street. There will be 5 cluster lights on 12 ft. post on corners, and 8 poles to each block to be combination light and trolley poles, with 4 cluster lights. The estimated cost is $14,737.

MEDFORD, ORE.—The Rogue River Public Service Corporation of Gold Hill filed a bid at the last meeting of the city council asking for a ten year franchise for furnishing light to the city. The promise is made that the rates will be 20 per cent less than those now secured from the California-Oregon Power Company. A suit between the city and the latter company is pending regarding the payment for service.

TEHACHAPI, CAL.—The board of trustees received the following bids for the construction of a municipal electric lighting system: J. W. Finch Company, Los Angeles—Concrete street poles, $12,662.25; with pressed steel posts, $12,531.25; with pipe posts, $12,323.25. C. C. Glass of Pasadena, $11,719; M. A. Stampher of Los Angeles, lowest bidder, $11,662.11.

SACRAMENTO, CAL.—Sacramento gas users will continue to pay the Pacific Gas & Electric Company and the Sacramento Gas Company $1 per 1000 feet during the coming year. Although the city ordinance regulating the cost of gas has read for a year that the commodity shall be sold for 95c per 1000 feet, the consumers have been paying $1 on account of an injunction brought by the gas companies. Last week the charter clause was changed to read $1 instead of 95c.

CENTRALIA, WASH.—The Centralia city commission has entered into a contract with H. G. Fleischhauer, formerly of the Washington-Oregon corporation, for the furnishing of electric current for heating, lighting and power purposes. The contract provides for erection of a new plant to be completed by October, and in addition provides a $10,000 bond that Mr. Fleischhauer carry out the terms of the contract. The plant will be operated by steam. The company will be composed of Western capital. This is the first contract sought by the concern. At present the city is paying the latter concern 2½ cents per kilowatt, but the new contract, which runs for a period of five years, provides for a 2 cent rate the first year and 1½ cents thereafter. The city agrees to use $825 worth of current a month.

TRANSMISSION.

OLYMPIA, WASH.—A franchise has been granted to Nillard Lemon and Wilbur B. Foshay for the construction of electric transmission lines in this city.

ESCONDIDO, CAL.—The Escondido Mutual Water Company has applied to the city trustees for right to enter the city with electric service lines to supply current for lighting, power, etc.

POCATELLO, IDAHO.—The Nevada Copper Mining, Milling & Power Company has decided to construct a power line to Contact. Work will begin soon and a power plant will probably be built.

SPOKANE, WASH.—A franchise for a power line from Deer Park to property of the Arcadia Orchards Company has been granted to the Little Spokane Light & Power Company, Deer Park, by the board of county commissioners.

COLVILLE, WASH.—The Stevens County Power & Light Company has petitioned for a franchise to dig and maintain over and across Aris public road a ditch or conduit for the purpose of conveying water from Colville River to be used for the generation of electricity. The hearing on the request has been set for June 15th.

CANYON CITY. ORE.—Vernon Glaze has been surveying lines for a two mile extension of the ditch of the Prairie City Light & Power Company. The ditch will terminate on the hill opposite the Galbraith house, at which point the company plans on the construction of a power plant. From here a transmission line will be built to John Day, to furnish power for the big dredge which is to be installed on Canyon Creek. It is understood that bids will be called for in a short time for the construction of the ditch.

TELEPHONE AND TELEGRAPH.

SEWARD, ALASKA.—The Nachorage Telephone Company is a new organization which will begin work here. H. J. Emard is manager.

FAIRBANKS, ALASKA.—A local telephone company is contemplating the erection of a telephone line from Fairbanks to the Tolvona district.

HOQUIAM, WASH.—An ordinance has been passed providing for the establishing on the telephone poles means of stringing wires for a municipal fire alarm system.

ALBANY, ORE.—Work has been begun on 12 miles of government forest service trail and telephone line from Cascadia on the South Santiam river, 45 miles southeast of Albany, over the divide to Quartzville.

RAYMOND, WASH.—R. H. MacWorter, manager of the Walliapa Harbor Telephone Companyy, has announced that his company is about to extend its service to Tokeland. A telephone cable will be extended across the bay at once.

SEATTLE, WASH.—The Marconi Wireless Telephone Company announces that it has abandoned its station at Friday Harbor. The station of the company in the L. C. Smith building in Seattle has become so efficient that the Friday Harbor relay station is no longer necessary.

SOUTH SAN FRANCISCO, CAL.—The Pacific Telephone & Telegraph Company has applied for the right to maintain poles and wires and to lay underground conductors for the transmission of electricity for telephone and telegraph purposes in this city. Sealed bids will be received up to June 21st.

OAKRIDGE, ORE.—Supervisor Sietz of the Crater Lake National Forest states that local telephone exchange will be established in Oakridge in the near future. A switchboard is to be installed and government lines extending out of Oakridge and now operated as one system will be separated into three systems.

TACOMA, WASH.—The Sunset Telephone & Telegraph Company will spend $13,500 immediately on telephone improvements in the city limits, according to the announcement of John Schlarb, manager. This will include the construction of a line through the south end of the city to cost $10,000 and a cable telephone service across the top of the Eleventh street bridge to the tide flats.

TUCSON, ARIZ.—The improvements to be made in this city by the Mountain States Telephone Company are to be greater than were at first planned as it has been decided to put the wires on Broadway underground and wires that were to be put through the alley near Sixth avenue will be put underground on Sixth avenue as far as Sixth street. The changes were made at the request of City Manager Clarke.

LONG BEACH, CAL.—The Pacific Telephone & Telegraph Company is contemplating improvements in its service, plans for which call for the construction of a 600 cable line, going underground from the company's main office with northern terminus at Willowville. The cost of placing down town district lines underground is estimated at $18,000 to $20,000. C. F. Mason, division commercial superintendent, and John Glass, district commercial agent, have charge of the work.

TRANSPORTATION.

LOS ANGELES, CAL.—The Pacific Electric Railway is understood to be negotiating for the purchase of the Spreckels railway interest in San Diego.

WATERWORKS.

PULLMAN, WASH.—A resolution has been passed by the city council providing for the construction of water mains in College Park Addition.

MARSHFIELD, ORE.—City Engineer J. S. Sawyer has filed his plans and specifications for an adequate water supply. The estimated cost is $79,465.

ABERDEEN, WASH.—The water committee has awarded the contract for supplying 17,500 feet of wrought iron pipe to the Grays Harbor Hardware Company at $1,191.25.

COLFAX, WASH.—At a recent election it was voted to spend $7000 on metal pipe and give future councils authority to spend what may be needed of an additional $53,009 to renew the pipe line between Glenwood and Colfax with metal pipe.

HILLIARD, WASH.—The Council considers the bill of the Washington Water Power Company for power furnished the pumping station excessive and is considering the question of installing a complete new power system, including two large gasoline engines. Bids will be called.

LOS ANGELES, CAL.—The Union Hollywood Water Company of Hollywood has sold its distributing system in the northwest portion of Los Angeles to the city for about $500,000. The company wanted $748,655 and the city bid $470,452. The company will continue in districts outside the city limits.

OLYMPIA, WASH.—An ordinance has been passed providing for the issuance of $90,000 in bonds for the acquisition of the Olympia waterworks system. The offer of John E. Price to purchase these bonds at par and accrued interest has been accepted. The bonds will be issued in denominations of $1000 each.

ABERDEEN, WASH.—If the council adopts the plans of Dayor J. M. Philips, this city will take steps at once to bond the city for $100,000 to secure a permanent water supply and power plant. The plan as outlined by the mayor is to tap the waters in the canyon of the Wynooche River and bring them a distance of 23 miles into the city.

ABERDEEN, WASH.—By unanimous vote of the Council Mayor Phillipps has been requested to name a committee of 12 leading business men outside the City Council, to include six financiers, to co-operate with the Council to work out a plan of procedure under which the city would become responsible for the development of the Wynooche water supply. Bonds would be issued to provide funds.

UMATILLA, ORE.—The city and the O. W. R. & N. Co. have now reached an agreement whereby Umatilla will be furnished with water. The railroad company will sink a well and install a pump and meter the water out to the city. The city will install its own distributing system which will consist of 6 and 4 inch cast iron pipes. Pike & O'Neil, Portland contractors, have been awarded the contract for the distribution system at $10,000.

SACRAMENTO, CAL.—Edwin G. Lewis of San Francisco has suggested to Thomas Coulter, commissioner of public works, that the city build reservoirs on the Cosumnes River and thus get its water supply direct from the mountains. The scheme would cost $2,497,032. Mr. Lewis holds that 64,000,000 gallons of water a day can be secured by building three reservoirs on the middle and south forks of the river in El Dorado and Amador counties. An electric plant could be run in connection with the waterworks also, according to Mr. Lewis.

SAN FRANCISCO, CAL.—The city engineer has asked the supervisors for $2000 to carry on an investigation of the Spring Valley water supply in outlying districts. He was requested by the board recently to report concerning the insufficiency of water furnished by the Spring Valley to Richmond, Sunset, University Mound, Potrero, Sunnyside, Bay View, Ingleside and south of Holly Park. The city engineer advises the supervisors to decline to purchase J. W. Bloom's well water system at the county line, which Bloom offered to the city for $50,000. He also turns down the proposition to reopen the wells at Bay View, from which the Visitacion Water Company drew a supply for the surrounding district from 1882 to 1905, when it ceased operations and sold its property. He says that the wells, which were sunk on a lot at the northeast corner of Keith street and Yosemite avenue, now owned by Dominico Armenio, who covered them up, would be useless now.

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B-2 **Benjamin Electric Manufacturing Co.**.....
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B-3 **Blake Signal and Manufacturing Co.**..... 3
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B 7 **Busch-Sulzer Bros.-Diesel Engine Co.**..... 5
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C-4 **Cutler-Hammer Manufacturing Co.**.....
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E-2 **Edison Storage Battery Supply Co**..... 3
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E-3 **Electric Agencies Co**.....
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E-4 **Electric Storage Battery Co**.....
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F-1 **Fairbanks, Morse & Co.**.....
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H-5 **Hunt, Mirk & Co.**.....
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H-6 **Hubbard & Co.**.....
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I-1 **Indiana Rubber and Insulated Wire Co.**.....
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N-2 **National Conduit & Cable Co., The**.....
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S-1 **Schaw-Batcher Company, Pipe Works, The**.....
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S-3 **Simplex Electric Heating Co.**.....14
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S-5 **Sprague Electric Works**..... 3
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S-6 **Standard Underground Cable Co.**.....
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W-1 **Wagner Electric Manufacturing Co.**..... 3
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W-2 **Western Electric Co.**.....
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W-5 **Westinghouse Machine Co.**.....
141 Second Street, San Francisco.

W-6 **Westinghouse Lamp Co.**.....
(See Westinghouse Electric and Manufacturing Co.)

W-8 **Western Pipe & Steel Co.**.....
444 Market Street, San Francisco; 1758 North Broadway, Los Angeles.